

## BUDGETARY CONTROL

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# BUDGETARY CONTROL

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## PREFACE

**T**HE DEVELOPMENT of the organization structure of modern business is characterized by its growing functional divisions. Within comparatively recent years the function of budgeting and the budgeting officer have assumed important places in industry. The concept of budgeting itself has grown. A few years ago the budget consisted of a few tabulations of anticipated results based on rather limited data. Today, carefully prepared data on every form and type of business practice are available from many government agencies and business associations. The statistical techniques for interpreting the data and applying the results to forecasting the operations of specific businesses have been developed to a high degree. These data and the techniques for using them have placed budgeting on a more scientific basis and have enhanced the importance of the budgeting functions and the budgeting officer.

This book attempts to bring together in one volume those methods and means of budgeting which experience has proved to be most useful for the control of a business. The applications of methods and means of budgeting to specific business are recorded throughout the book.

Special emphasis is placed on the fact that budgeting, to be successful, must cover all divisions of a business. It cannot be effectively applied to some operations and not to others. A missing gear makes the machine inoperative, no matter how well the framework and linkages may be designed.

The ultimate goal of budgeting, as expressed in the closing page of this book and repeated below is constantly kept in mind.

Budgetary control in the final analysis is considered effective when it results in maintaining the cost per dollar of sales at a minimum and the gross profit of the production mixture at its optimum point. To accomplish these results the units, methods, and means of measurement of the flow of expense with the rate of production must be scientifically sound in their relationship to the specific conditions of operation. It should constantly be borne in mind that the budgeter sees the business from the point of view of the dollar of profit. For him the business is not primarily producing goods. First of all it produces dollars of sales at a cost per dollar resulting in a profit per dollar.

The assistance given in the preparation of this book by our associates and friends, is hereby gratefully acknowledged: Mr. Daniel J. Hennessy, trustee of the Controllershship Foundation Inc. and executive vice president of the Jamaica Water Supply Company, whose guidance contributed materially to the scope of this book; Mr. Edmond S. La Rose, controller and member of the board of directors of the Bausch and Lomb Optical Company, who is generally acknowledged as the dean of budgeters, permitted us to examine in detail his methods of budgeting, read and criticized part of the manuscript and offered many valuable suggestions; Professor Frank H. Lee, of the Department of Graphics, School of Engineering, Columbia University, prepared the illustrations; Miss Janet Bogardus, librarian, School of Business; Mrs. Alice D. Hoffman, reference librarian, School of Business, and Mr. William S. Budington, librarian, School of Engineering, contributed important services on references; Mr. Ralph Blasingame, Jr., research assistant, School of Library Service, prepared the bibliography; Miss Marion Thompson typed the manuscript and prepared the tables. Many of our friends in industry permitted us access to data and charts.

Whatever of error may appear in the book is our responsibility and we encourage our readers to call them to our attention as they are discovered.

Athens, Vermont  
Westminster, Vermont  
*April 15, 1950*

WALTER RAUTENSTRAUCH  
RAYMOND VILLERS

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# BUDGETARY CONTROL



## INTRODUCTION

**T**HE CIVILIZATION of this century is one of rapid growth. The development of natural resources, the creation of vast aggregates of tool power, the increase in the population, all the trends of social and economic life are evidence of this rapid growth, probably the best characterization of our times, with all it implies of beneficial possibilities and of hazards, too.

With the great changes in the industrial potential needed to produce the goods and services demanded by an increasing population there have also been marked developments in the business processes concerned with supplying the needs of the population. But, since growth is neither an endless nor a uniform process, it is inevitable that the components of our industrial civilization and the whole business process associated therewith must be adjusted from time to time to the changes in rates and directions of growth. One of the determining factors influencing this adjustment is the rate of growth of the population.

In the year 1750, there were 1,207,000 inhabitants in the colonies

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which later became the United States. In 1760 there were 1,610,000; in 1770, 2,205,000; and in 1780, 2,781,000. The rate of growth thereafter increased more rapidly, and there were nearly 4,000,000 inhabitants in the United States in 1790; 5,000,000 in 1800; 7,000,000 in 1810; 23,000,000 in 1850, 31,000,000 in 1860, 75,000,000 in 1900, and 139,000,000 in 1945.

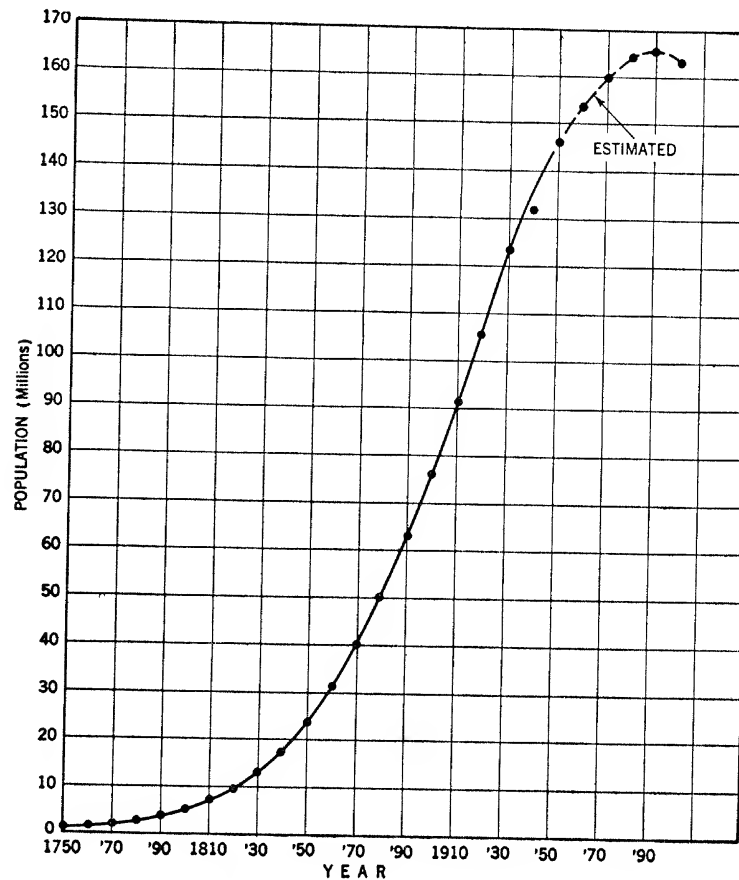


Figure 1. Size of the Population in the United States in Successive Years

000 in 1945. The graph of the size of the population in the United States in successive years is shown in Figure 1, and illustrates the variations in the rates of increase in size.

This graph has been projected into the future up to the year 2000 on the basis of forecasts recently published (under the assumption of

medium fertility and mortality, no immigration) [Whelpton, 1947; Nat'l. Resources Comm. 1938].

Figure 1 is a typical pattern of the "growth curve"<sup>1</sup> experienced by all civilized nations.

Unforeseen circumstances may sometimes alter the precise pattern disclosed by Figure 1. For example, the industrialization of Germany which followed the development of new techniques for the utilization of the Ruhr coal production seems to have substantially altered the pattern of population growth in that country during the second half of the nineteenth century [Pearl, *Essays on Human Biology*, 1924, 605]. The industrialization of Japan in the past century had the same effect. However, barring unforeseen circumstances, the trend of growth of the United States population appears to have now arrived at a stage of relative stability. The exceptional dynamism provided by the high rate of increase of the population during the last century as a stimulant to production and trade cannot be relied upon any more, or certainly not to the same extent as in the past. This does not mean there will be economic stagnation. Other changes in the environment may in turn stimulate the economy, such as an increase of the purchasing power of the population. But it appears that, for the time being and during the next few years to come, the economic prosperity is not going to be stimulated by the continuously favorable change in the environment of a continuously expanding population.

At the same time, it is a well-known fact, as lately widely discussed in the daily press,<sup>2</sup> that the break-even point of industry has very substantially increased during the last few years, and especially during the years following World War II.

Faced with the double problem of a high break-even point and of a market that may not expand as rapidly as it has for many years past, industrial management, particularly when adjusting and controlling expenses to probable future sales is in need of new techniques of control.

A rapidly expanding economy provides a dynamic environment of markets and credit which enables many speculative industries to come to life and survive *in that type of economic environment*. During the late war period, many businesses sprang up and huge profits were made on war contracts by types of industrial management which could not

<sup>1</sup> For a discussion of the growth curve and its applications, see Rautenstrauch and Villers, *The Economics of Industrial Management*, New York, 1949, Chapters XV and XVI. This book elsewhere referred to as *Eco. Ind. Mgmt.* See also Appendix A, Bibliography, for titles in full of other citations.

<sup>2</sup> *Fortune*, February 1949; *New York Times*, October 3, 1948; and elsewhere.

and did not survive under peacetime conditions. At the present time every company needs to assure its future by practicing those methods of economic management which have been more recently developed and applied under the general title of *Budgetary Control*. The term Budget, both in origin and practice, has an interesting history.

*Budget* (from the old French *bougette* or bag) was originally synonymous with control of expenses. When, at the end of the eighteenth century, the British Chancellor of the Exchequer did what was called the "opening of his budget," he was submitting his plans for expense to the Parliament for adoption and control, even though he did not actually open any *bougette* or bag.

When the budget procedure was adopted by the French about 1820, later by various European countries, and finally by the United States Federal Government in 1921, the emphasis was still on the idea of controlling the expenses which the budget officers had found were needed to operate the government.

After World War I, industry began to realize that it could also use the budget procedure profitably for controlling its expenses. Interest in the introduction of such a procedure in the industrial world grew rapidly [*Final Report*, 1930]. However, it is only recently, and then only by the more progressive businessmen, that the true character and the full possibilities of industrial budgetary control has been recognized.

But it is important to point out that there is a fundamental difference between governmental and industrial budgets, namely, that governments first estimate their expenses and then raise taxes or contract loans to cover them, while businesses have to estimate first their possible income, or funds available, and only then determine their most effective allocation and use in operating the business. This valid and pertinent observation, which has often been made, is not always fully understood nor are its underlying principles generally comprehended.

Experience shows that governments, in making their budgets, are infrequently, if at all, influenced by the problem of actually finding the money to cover their expenses. Once a decision has been taken by the policy-making body, the money is found, one way or another, either by obtaining the money from the public in the form of taxes or loans; or, if need be, by creating the money through the processes of inflation.

On the contrary, finding the money is the most pressing problem of any business, even the prosperous ones. They are, by definition, operated for profit. An expense that is not going to be ultimately a source of profitable income has to be avoided and an expense that is not made

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within the limit of an actual income is just physically impossible (being understood that credits are income, broadly speaking).

It is not in the least intended to create the impression that a healthy conduct of public finances is not desirable and necessary. But it is a fact that public budgets only *reflect* a policy, while industrial budgets *create* a policy.

While many companies have not consciously adopted the methods of budgetary control and seem to get along, the answer is, that every single business does in fact have a budget even if it is not conscious of it. By definition, a business is a budgeted venture: that is, every business can spend only what money or credit is available to it, in its purse—its *bougette*.

Well-managed businesses will not only consider what is in the purse at the moment, but will try to forecast the future income and the future expense, and will endeavor to control them to such an extent that they will be continuously adjusted to each other. This is budgetary control. Every business, by definition, has a budget; but even today, few businesses have a complete and efficient budgetary control.

It was not until within comparatively recent years that businessmen have had available to them two very important tools by which budgetary control could be established and operated, and these are the Break-Even Chart and the Sales Forecast. The first of these, developed by Rautenstrauch [see *Eco. Ind. Mgmt.*], provides the means by which any company may determine the relation of every class of expense to production, output, or sales. The second of these provides a means by which the probable annual domestic sales of an industry (such as tobacco, furniture, shoes, etc.) may be estimated from the annual income forecasts of government fiscal agencies and from appropriate indexes of national operations of many kinds. In addition to these two primary tools by which the items of the budget may be prepared there have also been recently developed certain techniques for estimating seasonal variations and other changes in income from sales which greatly facilitate the processes of budgeting. The tools for budgetary control may be used in various ways and therefore there will be found a variety of methods for such a control, each of which has its merits according to the economic characteristics of the business.

It is the purpose of this book to describe the methods by which some industrial organizations have found it possible to maintain an effective budgetary control.

Budgetary control, as previously pointed out, supposes a continuous adjustment of expenses to income.

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"Adjustment" and "continuous" are the two significant words.

*Adjustment* means that the expense will always be so budgeted as to time and circumstance that it will ultimately remain within the limits of the correspondingly available income—leaving the desired profit.

The first step toward adjustment is therefore a knowledge, at least approximate, of the income, its amount and rate of accumulation, and the sources from which derived, which is principally sales. The first part of this book will be devoted to a study of the *sales budget*. The various *expense budgets* will be next considered with the focus of attention centered on an important and most complex one: the *production expense budget*.

*Continuous* is the second significant word in industrial budgeting. It means that expense must be adjusted *at all time* to income. The last parts of this book will therefore be a consideration of both the short-term and long-term adjustments of expense to income, namely, the profit-and-loss budget, the cash budget, and the capital outlay budgets.

Sales and expense budgets (resulting in the profit-and-loss budget), cash and capital-outlay budgets are the four principal divisions of industrial budgetary control, each of which is incomplete without the other three. This has too often been lost sight of. A recent survey [Natl. Ind. Conf. Bd., 1948] discloses that even among the companies which consider that they "regularly budget," only two out of five indicate that they cover *all* divisions of budgetary control. Even this is a marked improvement on the results disclosed by a survey made some twenty years ago, at which time only 37 companies out of 141 budgeting ones reported that they had a complete control [Natl. Ind. Conf. Bd., 1931]. But it still indicates an insufficient comprehension of what budgetary control can and should be.

Budgetary control is not the sum of independent parts, any of which can be disregarded at will. It is a whole integrated system of control that cannot be split, nor any part omitted, without losing most of its reason for existing.

The driver of an automobile cannot drive safely if he does not control at the same time the whole mechanism: clutch and gear shift, brakes and accelerator, headlights and steering wheel, etc.

It is true that automobiles are sometimes driven with only partial control. But this is not safe driving. It is also true that many businesses are conducted and sometimes, at least for a while, are even successfully conducted, without proper control. But this is not safe management. It is, to a greater or lesser extent, a guesswork management. It may be good guesswork—some has even been excellent. But it is never safe.

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A current objection to a complete system of budgetary control sometimes made is that it is not "practical." Experience shows, however, that this objection is not valid. Complete budgetary control has been operated successfully in many difficult and complex situations so that it can be safely predicted that it could be adopted in almost any business.

But each type of business has its own requirements, and to function satisfactorily the budgetary control system has to be especially designed to serve exactly the needs and characteristics of each type of business.

This is, in fact, one of the most serious difficulties faced by the authors of this book. By overemphasizing the diversities and elaborating on the great mass of technical details it is easily possible to lose sight of the general principles involved. By ignoring the diversities the risk is to leave the solid ground of the reality of industrial operations.

The authors have tried to avoid both of these extremes.

Some chapters do not differentiate at all as to various kinds of businesses. For instance, the treatment of the cash budget obviously does not require any such differentiation.

Other chapters are written exclusively for a given type of business. In some other cases, part of the chapter is of general application, and part applicable to definite situations. (The reader will always be kept explicitly informed.)

To express the diversification among the various kinds of manufacturing businesses as to marketing characteristics affecting budgeting procedures, the authors have found useful the following general classification in four principal categories:

**FIRST CATEGORY.** The business of the "job order" type. (Small machine shops as well as large organizations such as shipyards.) This category is self-explanatory. Some businesses, such as intermittent manufacturing plants, are on the border line between this category and the following ones.

**SECOND CATEGORY.** The uni-product business, such as sugar or cement mills, for instance.

**THIRD CATEGORY.** The multi-product business, in which all the products follow the same pattern of economic sensitivity. There is, for instance, a definite pattern for non-durable consumer goods. It is well known that durable industrial products will not follow the same pattern at the same time. If, for instance, a company manufactures only non-durable consumer goods, or only durable industrial goods, it will prob-

ably belong to the category of the multi-product business in which all the products follow the same pattern of economic sensitivity.

FOURTH CATEGORY. If, among the products manufactured, some follow one pattern while others follow another one, the business will be classified in the fourth category: multi-product business in which the various products do not follow the same pattern of economic sensitivity.

The distinction between the third and the fourth category of businesses may not always be easy to draw, because the pattern of economic sensitivity of a given product is not always easy to determine. However, it is a fact that, with due consideration given to the border cases, some products definitely belong to one class rather than to another as far as their pattern of economic sensitivity is concerned. The manufacturer of war planes depends entirely on orders placed by the armed forces. The manufacturer of toys sold in ten-cent stores will find his market following a radically different pattern. Finally, a company that will, for instance, manufacture such lines of products as common spectacles, luxury opera glasses, industrial optical instruments (for inspection purposes) and military equipment (range finder) should expect each line of product to follow its own specific marketing pattern. The market for luxury opera glasses will react to a business recession or adjustment long before common spectacles. The industrial optical instruments' market follows that of industrial goods, not that of consumers' goods. The range-finders' market depends on national defense policy.

Variations in marketing patterns affect not only production inventory and income schedules but also the purchasing schedules. In some cases, the purchasing schedule, and hence the budgeting of funds for materials procurement, is independent of the marketing pattern and is determined wholly by the raw-materials market. For example, the beet molasses crop comes on the market during the fall and winter seasons, and those industries such as yeast manufacture and cattle feed production usually lay in their annual requirements during these seasons. Industries depending on foreign sources of raw materials often have to carry large inventories to take advantage of favorable markets and prices and also to assure non-interrupted production schedules.

From a budgeting point of view, it is important to know if all the products do or do not follow the same marketing pattern or differ as to raw materials purchase schedule.

The reader, however, should remember that the diversification of

business does not imply any renunciation of the general principles involved and especially no renunciation of the fundamental idea that the various divisions of budgeting that are now to be studied—essentially: *sales, expense, cash, and capital-outlay budgets*—are only parts of a whole, for any and all business categories: the *budgetary control*.

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# **PART I**

## THE SALES BUDGET



## GENERAL CONSIDERATIONS

**S**O MANY FACTORS influence sales that experienced businessmen often deny the possibility of devising any practical method for forecasting sales either for short- or long-term periods. This is not surprising, for two reasons. First, trade has always been a speculative venture and those who sell have always relied on current market conditions and their judgments derived from experience, and on their skills in the arts of selling. Second, those who have been successful in practicing the arts of salesmanship are not always acquainted with the scientific method and hence, not being familiar with its possibilities, are not in a position to understand that it can be of great assistance in the field of sales forecasting. The whole scientific management movement which arose at the beginning of this century was at first not looked on with favor by the manufacturers of that day because it, too, was considered impractical and no substitute for the long established methods of shop organization and management which had been "successfully" practiced for many years.



Yet it was the application of the scientific method to the control of the complex problems of production which made this country the great industrial nation it is today. Sales, of course, present a different problem than does production, particularly in the fact that there are so many factors external to one's own business that influence not only the market for the products made but also one's own position in that market. Sufficient experience with sales forecasting, however, is available to demonstrate that sales can be effectively budgeted within practical limits of accuracy in the most varied kinds of businesses [Natl. Ind. Conf. Bd., 1947].

Sales-budgeting procedures, however, will vary with each type of business and each type of market which it supplies. The degree of accuracy attainable will depend on the extent to which the effect of all the factors which influence sales can be related to sales. For businesses which are long established and for which there is a well recognized market, the problem of sales budgeting is concerned with answering the following questions:

1. What is the trend of company sales over the past years?
2. How does this trend compare with the industry as a whole?
3. In what particulars has any company policy been responsible for its sales having a better or worse trend than the industry as a whole?
4. What did the company do or fail to do which may account for the annual ups and downs of sales from the general trend?
5. In what ways may the trend and variations in annual sales be related to the economic conditions of the markets, foreign, national, and regional, which the company serves?
6. In what terms such as purchasing power, savings, credit, the investment market, inventories in the warehouses of merchants, etc., may these economic conditions be meaningfully related to the trend and the annual variations in company sales?

These questions suggest that the general trend of a company's sales, and the annual variations from that trend, are due to two principal groups of conditions: those within the company's power to control, that is, those related to company policy and action; and those in the total economy and sector of the economy which affect all businesses and specific industries or markets.

In illustration of the observations just made, the sales record of two companies for the years 1934 to 1944 inclusive, picked at random, are shown in Figure 2. The upper graph, that of the National Lead Company, and the lower graph, that of the Powdrell and Alexander

Company, manufacturers of lace curtains, each shows a general trend for the eleven years under review which is approximately similar to the other, and each also shows ups and downs from the general trend which are dissimilar as to times of occurrence, as is to be expected for companies manufacturing different products and supplying different

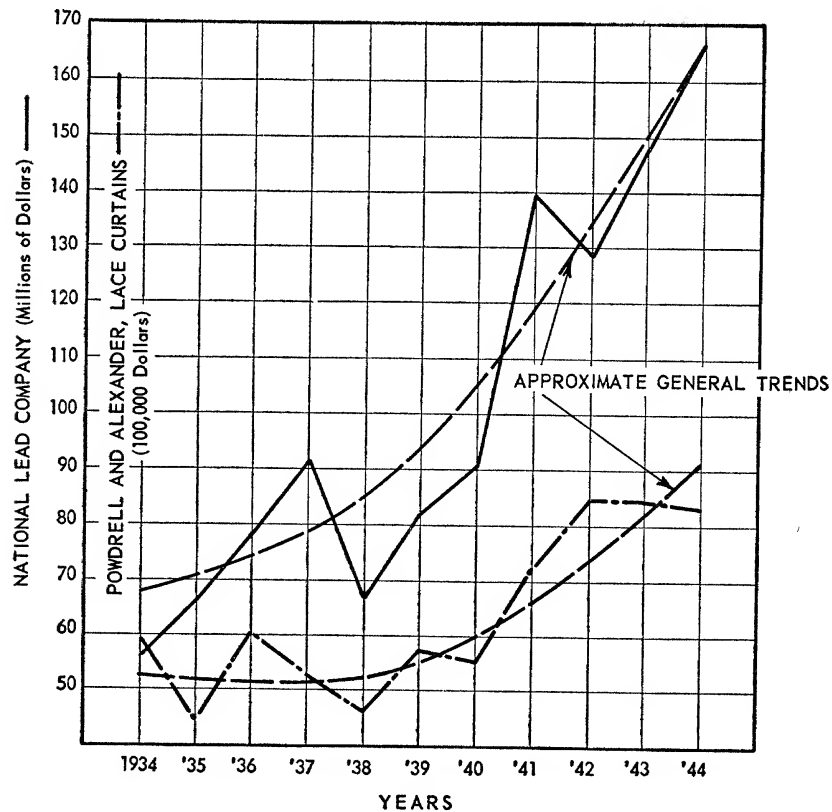


Figure 2. Graph of Sales of National Lead Co. and Powdrell and Alexander Co., 1934-1944

types of markets. If it can be determined, in each case, why the general trend occurred and what caused the annual variations, then it will be possible to make a rational approximation to next year's sales, provided the data on which such estimates should be based are available.

The secular trend or variation in sales over a period of years provides a pattern which was evolved from a variety of positive actions by the company, and from a variety of conditions peculiar to the industry in

which the company operates and to the market supplied, as well as to other contributory economic conditions of the economy as a whole. What were the internal and environmental factors associated with the increases and decreases in sales which the company experienced over the years? What factor or index of industrial activity, or combination of factors and indexes, can be found which are highly correlated to the general sales trend throughout the years? If the relationships of sales to certain known and controlling factors can be discovered, then it is possible by the expert use of such factors to estimate the probability of future sales both long-term and short-term. This is the basis for the scientific estimating of probable future sales. But the discovery of the causes for sales variations and trends for a particular company, and their embodiment in a forecasting technique, are not easy matters to accomplish.

The problem of sales forecasting is in some respects similar to the situation faced by the navigator on the bridge of his ship as he attempts to chart his course.

When charting the course of his ship from A to B, the navigator first considers the bearing of the route AB. This is the general trend of the ship for the next few days. But he also takes into account the winds, tides, and currents, so that, in fact, the ship, when leaving A does not really aim at B, but follows a route that compensates for the action of the winds, tides, and currents. This determines the course for the next few days.

A business also does not navigate in quiet waters. Customers' changing needs and wants, the availability of competing products, competitors' activities, and similar factors which are *specific* to the market of a given product at any time have indeed a determining influence. But the *general* influence is shown, for instance, by the following example chosen from among thousands of similar ones.

In 1928, the General Motors Corporation's sales were \$1,400,000. The year before, in 1927, they were \$1,200,000, and the year after \$1,500,000. Such comparatively minor changes were mainly due to *specific* conditions: the needs and wants of the customers, the activities of the other manufacturers, etc. In 1930, and in subsequent years, the influence of the general economic conditions created by the well-known depression were felt. Sales dropped to \$900,000 in 1930, \$800,000 in 1931, and \$400,000 in 1932.

To return to the comparison with the navigator charting the course of his ship: The determination of the influence of *specific* factors (customers' tastes, needs, wants; competitors' progress or activity, etc.)

can best be compared to the bearing of the direction AB that would take the ship from A to B if the sea was absolutely calm; the determination of the influence of *general* factors (general economic conditions, as to credit, prices, etc.) can be best compared to the tides, currents, and winds that may sometimes be so strong that they will even prevent the ship from reaching the harbor.

Charting the route is one thing; laying out the course as affected by weather conditions is another matter.

From the above considerations it appears that the budgeting of next year's sales for a company producing a single type of product and operating on a well-established market should be based on:

1. Conditions within the company over which it has specific control within the limits of the company's structure and operating characteristics.
2. Conditions in the market to which company operations must be adjusted or to which they must conform.

The conditions will be different as to kind and importance for each type of business, and each type of market. By a company's structure and operating characteristics is meant its financial resources, its human resources, its cost characteristics, and other capacities and limitations which establish its character.

Accordingly there is no *general formula* for sales budgeting which is applicable to all businesses nor all companies doing the same type of business. Sales budgeting is a highly individualistic affair just as is the doctor's problem of prescribing treatment for patients who may have the same type of sickness but with different organic conditions of the heart, blood, kidney, or other bodily structures. However, the procedure in diagnosing may in each case follow the same general pattern.

Our concern must first be with diagnosis, or the establishment of systematic categories of conditions which will have an effect on future sales. Our next problem is then to answer the question: "Will each of the specified conditions affect the sales of the company under review and if so, how much in each instance?" The very nature of the problem of sales budgeting is such that it should not be expected that the first attempts will result in a high degree of accuracy except under unusual circumstances. The approach is one of discovering functional relations between specific conditions and anticipated sales, and then deriving empirically those "operators" or "factor values" which express the functional relations quantitatively. Several, and in some cases many, attempts may have to be made before the factor values derived may

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be used with confidence. But no matter how many attempts must be made before practical results are attained, the method, being based on the scientific approach to the solution of such problems, gives assurance that if the problem can be solved at all, this is the way to go about it.

So far, we have referred to budgeting sales on an annual basis, that is, we have considered the problem of estimating probable sales for the next annual period or the fiscal year. Such estimates then become the bases for determining the annual income and expense budgets and the details of fiscal policies according to the resources and the credit of the company. It is not to be inferred that budgeting is only an annual event, nor that there are no seasonal or monthly components of the budget. Budgeting is a continuous process in the sense that there often need to be forecasts of sales for the next month, the next quarter, or the next semiannual period. At the first of March, for example, management should anticipate April sales, the sales up to July 1, and sales up to October 1, in order to make the necessary purchase commitments for materials, supplies, and capital account as well as to arrange for the necessary cash or credit to meet these anticipated obligations. In some cases it will suffice to set up the sales budget in terms of its monthly components and then prepare the sales budget for the next year, say 3 or 4 months in advance. A company adopting such a budgeting procedure may then prepare and complete its budget in October, for example, for the next annual period beginning January 1 of the next year.

It should also be borne in mind that a budget estimate is based on data available at the time the budget is prepared. Accordingly, as new data become available during the budget period and new market conditions develop, appropriate adjustments should be made in the budget. An annual budget is therefore not to be considered as a rigid, inflexible timetable. It is rather the plan of a campaign to capture a given market objective in which many commercial battles need to be fought. As the market shifts its position and commercial battles are won or lost, the plan of campaign should be adjusted. But the important thing to bear in mind is that there must be something to adjust. If there is not a general plan of campaign and no program to support that campaign, the chances for capturing a given market objective are only speculative. Business then becomes merely commercial guerrilla warfare.

As noted previously, the determination of a company's next year's probable sales (the annual sales budget), should be based on the propositions that;

1. The *market* or total annual sales of a given product supplied by a number of producers will in part be conditioned by prices operating in the economy as a whole and which are not subject to company control.
2. The *position* of the company in the market will be determined by its policies and programs, or by individual circumstances, that is, by conditions within its own control or which are accidental.

To acquire a clearer perspective of the conditions or factors influencing future sales, and particularly the functional categories in which these factors may be grouped, it will be helpful to examine the problem of sales forecasting from the standpoint of company procedure in getting the information and data on which it should base its sales estimates. The essential elements of a rational procedure are as follows:

1. In the first place, the company must rely on the salesmen who are in direct contact with its customers, who may be the ultimate consumers, dealers, and distributors, for data and information concerning
    - a. Consumer reaction to such matters as styles, models, prices, term payments, services, and other factors which may influence the desire or ability on the part of the consumer to possess the commodity offered.
    - b. Dealer and distributor reaction as to the advertising policy of the company, forms of distribution or dealer contacts, territory protection, price range of offerings, product design, packaging, sales services, displays, and the advantages and disadvantages of competitors' offerings from the marketing point of view.
  2. In the second place, the sales manager who is familiar with the character of the industry of which the company is a part, and its markets, is relied on for advice as to trends in growth of the industry and on other matters specific to the commercial developments in the industry and the changing character of its markets.
  3. In the third place, the engineer must be depended on to supply information on ways and means for possible improvements in the design of the product, to extend its range of commercial adaptability, to adjust it to desirable market-price ranges, to adjust its quality to market requirements, and to lower the cost of production. He is also in a position to advise on new developments in competitive products and other technical matters which may influence the sale of the company's products.
  4. The economist (either on the permanent staff or engaged as a
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consultant) has an essential contribution to make, for it is he who is capable of advising on

a. The significant changes in general market conditions both domestic and foreign, and

b. The trends in the national and regional economies as affected by federal and state legislation, the national and regional incomes and their distribution, and the underlying currents in the total economy which will have their effects on future sales.

5. Supplied with the information and data from all these sources it then becomes the problem of management to determine major policies and formulate appropriate courses of action as lie within its power, to improve the company's position in the market, enhance its profits, or be the best procedure as to high policy to follow under the circumstances.

The above procedures indicate that there is a continuous influence of market conditions on company policy and of company policy on the company's position in the market. The sales budget, therefore, in final analysis results from an estimate of the interaction of all the factors involved.

Such factors can be grouped in three categories, which will be the subject of each of the three following chapters, namely:

1. The specific sales factor
  2. The general economic forces
  3. The administrative influence.
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## SPECIFIC SALES FACTORS

**A** WELL-ESTABLISHED company selling a single line of products such as valves, furniture, tin cans, meat products, or cement on a national scale, represents the kind of company for which the preparation of a sales budget is less complicated as compared to a company manufacturing a variety of different products and selling them in different markets. Therefore a business of that nature will be used to illustrate the principles underlying the preparation of a sales budget. Subsequently the more complex situations of a company manufacturing a variety of products for sale in different markets will be considered.

An established company has a record of annual sales which show, for example, that this year's sales are 10 percent higher than last year's sales. What actions by the company or what unforeseen, perhaps non-repetitive, circumstances as far as the company is concerned, had either a positive or negative effect on the sales period under review? Would sales have been greater or less, and by how much, if a particular event



had not occurred? Did an improvement in the quality of the product enhance sales? Did a change in pricing enable the company to reach a certain sector of the market which was not exploited before? These are the kinds of questions which, when answered, will serve to explain *in part* the change of the company's position in the market during the past year. Answers to such questions will also assist the management in estimating the probable effect on next year's sales if certain changes in company activity are made, or if certain accidental circumstances favorable or unfavorable to sales are not repeated.

What were the specific sales factors which had an influence on the sales result observed? Upon examination it is found that the specific sales factors fall into three general groups, which are:

- I. *Adjustment factors*, accounting for the accidental and presumably non-recurring events.
- II. *Change factors*, accounting for the durable effect on sales through changes initiated by the sales and factory personnel, or resulting from changes in market conditions.
- III. *Current growth factors*, accounting for the cumulative dynamic of the company's past sales efforts and for the inductive effects of the development of the industry of which the company is a component. These can be considered as a special kind of change factors.

#### I. ADJUSTMENT FACTORS

No year in any company's history is without some incidents which have either favorable or unfavorable influences on some aspect of operations.

Those which may have an effect on sales are many and varied. A few will be listed, any one or combination of which may occur in any company's history.

A. Those conditions which may have had a detrimental effect on a company's past year's sales and which have been satisfactorily adjusted or removed or may be counted on not to recur may be:

1. A fire which results in a few weeks' or a few months' delay in shipments and which cannot be compensated for by subcontracting with other manufacturers.
2. A failure in the source of some raw materials or parts furnished by the manufacturers who, for one reason or another, were unable to deliver either wholly or partly for either a limited or

extended period of time. Many manufacturers during the postwar adjustment period were unable to procure their full requirement of some essential part or material and hence their sales were correspondingly reduced. Not infrequently a company's regular suppliers may be bought out by a competitor, with the result that shipments on sales orders have to be postponed until a new source of supply has been established. This more frequently happens with small companies whose requirements of some essential material or part is not sufficient to warrant purchasing from a number of suppliers as an assurance against interruption in materials supply.

3. A strike may occur, with the result that shipments on account of customers' orders may be delayed and not appear in last year's sales. During the period of the strike, new orders may be curtailed and hence current sales reduced through fear on the part of customers that the strike may prevent deliveries at their required dates.

4. A patent suit may be brought against the company on an alleged infringement of another's patent. In that event some regular customers may cease buying for fear of being involved as contributory infringers through the use or sale of the product which is the subject of the litigation. This will affect sales and may continue to have a serious effect until the matter has either been adjudicated in favor of the company or proper license provisions have been made.

5. At the present writing many customers in foreign lands have had to curtail their orders because of dollar shortages or because of new import duties established by their governments. Sales to such customers may not be counted on for the coming budget period and hence appropriate adjustments in the sales forecast must be made. If sales during the past year were affected by these conditions and it appears that during the next budget period these restrictions to sales will be removed, permitting foreign customers to renew their orders, then this possibility should be taken into account in adjusting last year's sales to the expectations of the coming budget period.

6. If during the past year the sales in a given territory were restricted because of the resignation or death of a competent sales manager and that situation has been satisfactorily filled for the next budget period, appropriate anticipations of sales improvement in that territory should be accounted for in next year's budget.

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These constitute only a few of the many circumstances any one or a combination of which, together with other similar circumstances, may result in last year's sales not being what they should or would have been had these circumstances not been encountered. If it appears that they will not be occurring in the coming budget period, then sales expectations should be adjusted correspondingly upward. How much the upward adjustment should be is of course a vital problem and only some of the methods for estimating the "how much" will be indicated in the examples given in the latter chapters of the book.

B. Those conditions which may have had a salutary effect on a company's last year's sales and which can reasonably be expected not to recur, may be any one or combination of the following:

1. A non-renewable order due to exceptional circumstances. The company may have taken an order for supplying a new company with a part or completed product and the new company expects in the coming year to manufacture on its own account. An established company subcontracts to the subject company for the manufacture of certain products which it is accustomed to produce but which, because of a fire or temporary disability, it finds necessary to procure from others. Other circumstances of like nature may have contributed to last year's sales and because of the accidental nature of such business must be discounted in estimating future sales.

2. Another adjustment factor which deserves special mention is that due to a change in the backlog of unfilled orders. This is of particular importance in businesses in which the time required to manufacture is significant. When current orders are not received at the rate at which shipments on unfilled orders are being made, current sales are not indicative of future sales. A company with a backlog of unfilled orders which is not being replenished or, on the contrary, which may be increasing, must modify its purchase commitments and in other ways reestimate its forecast of expenses and financial needs with reference to its anticipated next year's income.

3. A new territory may have been opened up on a trial basis and found to be unprofitable, so that after a year or two sales effort in this area is discontinued by previously established policy. Sales from this territory cannot be counted on in next year's budget and therefore an adjustment of last year's sales to a "would-have-been" basis should be made.

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4. It is also possible that a recently gained new and important account will result in an increase in next year's sales and this also calls for an adjustment in sales expectations. In those businesses depending on a few customers—such as are found in certain subcontracting concerns producing parts for other manufacturers or companies manufacturing heating, ventilating and air-conditioning equipment—the loss and gain of one or more accounts results in a large percentage change in annual sales.

The adjustment factor is, then, that quantity which embodies all the pluses and minuses of quantities of sales which may reasonably be expected not to recur and because they did occur constituted a given component of last year's sales. New conditions foreseen for the next year are not part of the adjustment, but of the change factors described below.

The adjustment factor, it has been noted, provides a means for estimating what last year's sales *would have been* except for certain accidental circumstances as considered above, and what they *would be* over last year as a result of new accounts, etc. The change factor provides a means for estimating what sales *may become* if certain changes in company policies in the ordinary course of business, and means and methods for implementing such changes in policies, should be adopted, or if certain changes occur in specific market conditions.

The change factor may have many components, a few of which will now be described.

## II. CHANGE FACTORS

The personnel, under the direct supervision of the general manager, may make changes having effect on sales. These changes are, in general, concerned with the product, with methods and means of production, and with marketing. The nature of such changes in each of these areas are as follows.

### A. Product change factor

The redesign of a product for improvement in performance, appearance, or in other particulars usually influences customer appeal and cost of manufacture. Many manufacturers learning of new materials, new processes of manufacture, new machinery of production, and the possibilities of adapting their products to new uses, find that changes in the design of their products are necessary if advantage is to be gained from the new possibilities. These changes will influence sales in terms of quantity, dollar volume, and profitability. They therefore will be

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reflected in the budget of sales, and also in expenses and profits. A case recently came to the writers' attention, in which a linoleum floor-cover manufacturer deliberately reduced the quality of his product so that renewals would be more frequent and hence annual sales increased. His theory was that the housewife frequently wanted a new design pattern of floor covering just as she wanted new style dresses and hats, and hence if the material wore out she could justify a new purchase. The sales of the company did increase materially under this policy. Profits were greater even at lower prices because of low quality.

On the other hand may be cited the case of a cigar manufacturer who, having increased sales through good marketing methods and a cigar with good quality tobacco, changed the design of the cigar by substituting a cheaper and lower grade of tobacco, with the result that sales dropped off substantially. He was unable to recover his market and became bankrupt. During the last war, many manufacturers were not able to obtain the raw materials normally used by them for manufacturing certain parts of their products and were compelled to use inferior substitutes. As a result, they lost many customers who were regained only after they were assured that the product was what it had been in the prewar period. This was the case with a well-known producer of toothpaste who during the war sold a somewhat inferior product. After the war, he was put to considerable expense to convince his customers that the product was of the quality they had known in the past. Some well-known manufacturers, faced with a similar situation, accordingly chose to discontinue production of their standard products during the war rather than endanger their good-will.

Whenever, and for whatever reason, there is a change in product design, its consequences in sales must be weighed and reflected in the sales budget. A few years ago a well-known car manufacturer made the fatal mistake of adopting a new design that was a definite technical improvement but became a commercial failure because the public was not, at the time, ready to accept such an improvement. During the last few years, many improvements in car design have been indefinitely postponed, although they are technically desirable and because it was forecast that such improvements may not be readily accepted by the public.

In general the following types of product changes are among those which may be made that will have a beneficial effect on sales:

1. Improvements in function, adaptability, and other qualities which can be made at non-prohibitive increases in cost.
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2. For mechanical or electrical goods, particularly for household or non-expert use, changes in design which will permit ease in adjustment, repair, or replacement. On the other hand, it is frequently necessary to design the product so that adjustable parts be not accessible to the non-expert user for obvious reasons.

3. Adaptability to new uses which will help to expand the market for the product.

4. Simplification in design which makes possible better quantity production of parts. This lowers the cost of production and may help the company to make better price offering.

5. Standardization, which has the same general effect on sales as does simplification.

6. The use of new and improved materials which result in lower cost of production, better serviceability, or better quality performance.

If any of these and other similar changes in product design are incorporated in the product to be offered during the next budget period, then their effect on the sales budget will be beneficial not only during the next budget period but particularly over a longer period because of accumulative good-will.

#### *B. Production change factor*

Frequently sales are lost, and customers go elsewhere for supplies because the producer can not guarantee or live up to delivery dates.

1. Improvements in factory lay-out, in methods of manufacture, in planning and scheduling operations, and in inventory control will frequently permit the company to assure the customer as to delivery dates. This is particularly important when the company is the supplier of products which must be delivered to industrial customers who have rather tight production-line schedules.

2. A well-organized production program will also permit better service to the customer because then the company can more readily adjust its production schedules to meet a customer's unexpected or immediate needs. A disorganized production program cannot be controlled and hence will usually result in unsatisfactory service to the customer. In evaluating the effect on sales due to delayed deliveries or inability to assure prospective customers on specific delivery dates, it is essential that a record of such occurrences be kept and their consequences in loss of sales estimated. Without

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specific data there is usually a difference of opinion between production and sales which is detrimental to effective cooperation.

3. Improvements in production also frequently lead to lower costs which permit better competitive pricing and sometimes enable the company to compete in a lower price range market.

4. More recently, many companies have found that the introduction of quality control has influenced sales very favorably through the customer being assured of merchandise which meets his requirements.

These, and many other changes which may be made in the organization and management of the internal working of the factory, will have their effect on sales. Even if the immediate consequences on sales cannot be determined without a considerable degree of probable error of estimate, yet the long-term effect will be positive and may be relied on with confidence.

### *C. Market change factor*

The sales manager, being in direct and indirect contact with the ebb and flow of current opinion in the market place, and the changed and new character of the elements of the market, is in a position to advise on the effect of these changed conditions on the probability of sales for the next budget period. Here again it must be stressed that it is important to have such information systematically prepared so as to avoid too much estimating on a "hunch" basis. The area within which the sales manager should be responsible for estimating the effects of market changes and that in which the economist is better adapted to forecast probabilities is not a clearly defined one. Indeed, market changes often call for revisions of the sales budget based on the viewpoint and estimates of the sales manager and of the economist. Both should work together. Often the sales manager, through his intimate touch with the market, will note a change, such as a crop failure in a given region, the movement of an industry from the north to the south, a contemplated increase in housing in a given suburban territory. These should be called to the attention of the economist who, because of his skill and training can forecast the effect of such movements in terms that will enable the sales manager to make his own forecasts. The way in which a current market change was dealt with in the following example is a good case in point.

The recent increasing popularity and sales of television sets was of great concern to the sales managers of radio manufacturing companies.

Noting the rapid growth in television sales and the corresponding decline in the sale of radio sets, many companies, on the recommendation of the sales manager, increased their production schedules of television sets and correspondingly reduced them for radio sets. One manufacturer converted an entire plant (one of several) from radio-set manufacture to television-set manufacture. From the evidence before the sales manager this was the logical step to take. But, if the economist had been consulted in the matter, he would have called attention to the impending recession in general economic conditions which in the first part of 1949 reached disturbing proportions and seriously affected the sales of television sets.

During the second half of 1949 and the beginning of 1950 general conditions improved greatly, again emphasizing the exceptionally favorable specific sales factors for television. Estimates of a leading company considered in the trade as conservative indicate the following potential market for the years to come:

1950 —	3,100,000	sets
1951 —	6,200,000	“
1952 —	9,900,000	“
1953 —	14,200,000	“
1954 —	19,100,000	“
1955 —	24,450,000	“

Among the market changes which should be considered in estimating next year's sales, in some cases by the sales manager alone, in others in cooperation with the economist, there are to be noted the following typical ones:

1. Changes in *fashions* and *tastes*. This is very noticeable in clothing, particularly women's shoes, dresses, and hats; furniture, floor coverings, draperies, and other household equipment. Often competitive offerings capture the imagination and tastes of the consumer, so that manufacturers of phonographs, pianos, dinnerware, glassware and hundreds of other commodities experience varying degrees of shifts in consumer demand. These market changes can usually be dealt with adequately by the sales manager alone.

The change in *style* from long skirts to short skirts about a generation ago, had serious repercussions in the dress-goods business and enhanced the demand for sheer silk stockings. In every business there are shifts in fashions and demands for different style

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goods, some of which may have significant effects on sales during the next budget period and others a cumulative long-term effect which may alter the styling of the industries' offerings at different levels and patterns. Men's hats is a good example: stiff hats have given way to soft hats and then again the entire industry is affected by the tendency of many young men to wear no hats at all. The change from sulfur matches to safety matches, then to the small-package safety match, and then to the pocket lighter is an example of a series of style changes which have had influence on sales in the match business. The change in smoking habits, resulting in a great proportionate increase in cigarette sales as compared to cigar sales, and a decline in the sale of chewing tobacco, is an example in market change which should be noted by the carton manufacturer, the cigar-box manufacturer, and allied affected businesses.

2. Another factor which changes the complexion of the market is the population. Changes in population may be in terms of location, numbers, composition, and age, and may have both regional and national significance. The rapid growth in Bergen county after the opening of the George Washington Bridge over the Hudson River created new demands for housing materials, home furnishings, soil pipe and many thousands of other items. Salesmen in such a region quite properly bring market changes of such character to the notice of the sales manager. He in turn may quite properly request the economist to evaluate the meaning of such a population migration in terms of sales of the company products.

The change in composition of the population from white to colored in the north Harlem section of New York causes a significant change in the character of the market in that area. The sales manager would note such a change; the economist could interpret its meaning in sales. The development of Florida as a winter resort and as a permanent residence for aged and retired people brought very significant changes in the quantities and types of commodities demanded. The growth in automobile transportation and the construction of better roads throughout the United States has caused a migration to suburban areas which not only changed market locations but also created new demands for articles such as lawnmowers, etc. which are not the equipment used in apartment living.

The increase in longevity due to better medical care, food habits, etc. has resulted in an increasing percentage of old people whose wants and needs are quite different than those of the younger

generation. While this influences more particularly the long-term trend of the market for certain commodities, it may at the same time have some significance for current budget estimates if there is a cumulative pent-up demand for new and improved types of equipment needed and preferred by older people, and which has not been adequately provided for over a period of years.

These are only a few of many examples which may be cited to illustrate the importance of population in estimating sales.

3. Changes in economic activity, especially of a particular region, may have important consequences on sales in that region. The anticipated failure of the potato crop in Maine or the citrus fruit crop in Florida or the wheat harvest in Montana will produce a down trend in sales in these regions. The sales manager who is in a position to know these facts, should report them with a request for interpretation by the economist. Conversely, abundant crops at good prices, or favorable parity ratios assuring good government subsidies, will bring a favorable tide to swell the potentialities of the market in agricultural areas. The shift in activity in cotton textile manufacture from New England to the Southern states, with consequent change in payroll distributions in these areas, had important effects on the markets in both of these areas. The economist would probably note this change first and caution the sales department. The introduction of cold roll continuous-sheet mills, with a resulting decline in employment of approximately 250,000 workers in the steel industry, seriously affected the market in all the steel towns where this transformation took place. The closing down of paper mills in Vermont and their transfer elsewhere; the advent of chain stores in small towns to which the local farmers formerly came to trade their produce with the local merchants for meat, tobacco, and other necessities has created a market for chickens from Idaho and potatoes from Long Island but at the same time restricted the market and hence the purchasing power of the small farmers in such areas.

These and many other changing economic activities in different areas should be taken account of in building up the data of the sales budgets of those companies which are affected by such changes in economic activity. Market change due to competition must also be given recognition in estimating the sales budget. Such changes clearly would be

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noticed by the sales manager and would not as a rule be sought for by the economist. Aluminum at favorable prices will expand the market for aluminum-steel-cored transmission lines and tend to restrict the market for copper transmission lines. Accordingly all three industries, aluminum, steel, and copper, must carefully note the trend in transmission-line development, and the sales ratio (aluminum to copper) to evaluate properly the effects on their respective markets. These trends may have an immediate effect on the annual budget being currently prepared and on the long-term budget as well.

Competitive offerings may have only regional effects depending on the acceptability of certain types of products to the needs or tastes of regional groups. Competitive offerings in supplies and equipments for cotton culture will affect the market in the southern states only. When flexible-runner sleds were introduced, the northern states were the only ones interested.

Competition in products is not the only type of competition for which effects on the sales budget must be estimated. Not infrequently a competitor may gain control of important sales outlets in a particular region and such control will restrict the market for others. Sometimes competitors will seek to enlarge their market in a given territory by advertising and other sales promotion campaigns. Sales managers must be alert to the possibility of such competitor activities in relation to the effect on sales in the region and to the expense budget of the company for sales promotional activities considered necessary to maintain its position in that market. The same types of problems occur in the foreign market, and at the present time those companies doing a substantial business abroad may need to revise their current budgets either upward or downward, depending on the shifting competitive trends in such markets. The devaluation of the British pound, for example, has had a marked effect on textiles and other subjects. Competition may affect the market in many other particulars and any sales budget which is prepared without taking account of such effects will contain just one more element of probable error.

#### *D. Marketing change factor*

The nature of the market which the company serves and the position of the company in that market, in well-organized and competently managed businesses, are subjects of constant study. The probable response of the market to changes in marketing procedures must also be carefully weighed if the results of such changes in terms of sales and

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expenses are to be intelligently dealt with budgetwise. Price changes affect sales volume.

1. How will the market respond to price change and what will be the probable effect on profits? Are the company's prices out of line, either upward or downward? Should prices be adjusted downward and, if so, by how much to assure an expansion in sales? Will this result in lowering manufacturing cost increments more than the increment of price reduction?<sup>1</sup> These and a host of similar questions are constantly before the sales manager and his decisions in such matters will have their effects on sales. There are other questions of selling price which are of a more fundamental character and these pose questions of high policy which it is the responsibility of the directors, acting on recommendations by the economist, to decide. An increase or decrease of a few percent in the price of some of the company's products is a decision usually made by the chief sales executive. To enter the market with a low-priced car is a decision of high policy to be made by the board of directors. These will be considered subsequently.

2. Servicing the product through guarantees or otherwise is often an important point in establishing and maintaining sales outlets. This is of particular importance in marketing household equipment. The extent to which the company maintains repairs and replacement services may define its sales territory. Changes in such services through expansions, retractions, or in extent, will have their influences on sales volume and should be considered in setting up sales quotas. Distributors often will not take on a line of products if the manufacturer either cannot or will not provide adequate support for customer needs for repairs, replacements, or adjustments. Some products may require demonstration service for their proper introduction in a new territory. Failure to provide such service will restrict sales. The provision of such service during the next budget period may introduce an element in marketing that will increase sales during the next budget period and build up good-will affecting future sales.

3. If the advertising program of the company is changed and the usual and familiar pattern is altered, there will be an effect on sales. The effect of adopting new advertising channels or dropping old ones, and many other changes in advertising procedure

<sup>1</sup> For a detailed consideration of the effect of selling-prices change on the breakeven chart of the company, see *Eco. Ind. Mgmt.*, 189 et seq.

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are not easy to evaluate in terms of sales. Many alert companies, however, endeavor to get information through the use of keyed advertisements, response to radio announcements, etc. and thus are in a better position closely to approximate their effect on sales volume and net results.

4. Methods of distribution through distributors, jobbers, manufacturers' agents or direct to dealers, and the details of relationship with such agencies as to discounts, premiums, and many other particulars, determine important elements of the pattern and structure of the company's means for reaching its customers. Changes in this pattern or structure are often not without consequences in sales volume. The effects of any contemplated changes in this area of operations must accordingly be carefully weighed and when adopted should be reflected in the sales budget.

5. The compensations to salesmen in terms of drawing accounts, commissions, salaries, and expense allowances for travel, entertainment, etc., affect the degree of sales effort and hence should be included as factors in determining sales quotas.

### III. CURRENT GROWTH FACTORS

The term *growth* is used in an algebraic sense in that it may be positive or negative, indicating an expansion or contraction in sales. The preparation of the sales budget requires consideration not only of the adjustment and change factors as noted above but also of current trends in the growth of the company sales and of the sales of the industry of which the company is a component.

These current trends in either expansion or recession in sales, while due partly to company activity and partly to the current movements in the industry, are not to be confused with the effects on sales brought about by the major economic forces in the total economy which influence all business activities. The adjustment factors and the change factors are based on situations which are more specific than those which condition the current growth factor either upward or downward. The latter is therefore of a type which may be classed as observed relations, the causes of which are not always clearly definable in terms of company activities or of forces operative in the industry with which the company is identified. It is the kind of influence which businessmen have in mind when they speak of current prospects for business being good or bad, and when prospects seem good on which they frequently base a program for long-range production without regard for basic economic conditions. A manufacturer of our acquaintance added the pro-

duction of video antennae to his line of products, counting on the then rapidly increasing popularity of television sets for which other manufacturers had scheduled considerable volume production. But the foundation of underlying economic conditions in the total economy, to which reference will be made in Chapter III, could not then support the anticipated volume of production in this field. Sales accordingly suffered a marked recession precisely at the time (beginning of 1949) they were most needed for supporting the new line of production. Later on, in 1950, the use of built-in antennae brought about a typical change in market conditions which again unfavorably influenced this line of production. The current ups and downs in sales which are superimposed on the general tides in sales due to more basic economic conditions should be accounted for in preparing sales estimates not only on an annual but also on a semiannual or quarterly basis according to the observed variations recorded in the company's history of sales.

Current growth factors arise from two principal sources:

The cumulative dynamic or momentum inherent in the company's good-will and business vitality.

The inductive potential of the industry with which the company is identified.

The *cumulative dynamic* which carries a company steadily forward or the lack of which may cause sales volume to be erratic and sometimes disturbing is often termed good-will. The United States Supreme Court once defined good-will as the disposition on the part of the public to return to the place where it has been well served. The "disposition on the part of the public to return" is something which is built up over a period of years. It is therefore cumulative. It possesses a certain dynamic because it will carry forward for a long time without much stimulation through sales effort. It will, of course, die down unless fed. Like a tree, a business has certain characteristics of growth according to its germ and seed properties. Dry weather may retard its growth and a severe winter may kill some of its branches, but its general pattern of growth will persist. Many businesses experience "dry periods" and "wet periods" which alternately curtail and stimulate sales but a graph or plot of annual sales for a period of years will often show a distinct central tendency or trend. This trend is *partly* due to the inherent properties of the business and the stage of its growth. It is also partly due to the forces operative in the industry with which the company is identified.

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The *inductive potential* which influences all components of the industry acts on a particular company according to its permeability or capacity to be affected by the general current of activity of the industry as a whole. A general increase in public demand for a given product will increase the possibility of sales for all units in the industry and the sales of many companies may be carried forward by this induced current of demand generated by the industry itself. Some companies, recognizing the value of this induced demand, have organized industry sales campaigns such as to promote buying bread from bakeries or letting the laundry clean your clothes, with the result that all bakeries and all laundries have greater sales possibilities. How the individual company takes advantage of these possibilities determines what the induced demand for their products will be. It may be raining but if you hold up a small cup it will soon run over and if you use a sieve you will catch no rain water whatever.

In general it may be said that both the company's and the industries' current growth trend will influence next year's sales, and the determination of the extent of these influences is part of the problem of estimating the probability for next year's sales. Estimates of sales variation based on these considerations usually can be adequately made under the supervision of the sales manager.

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## GENERAL ECONOMIC FORCES

**B**USINESSMEN, gathering together, at a convention for instance, rarely discuss business conditions in terms of the specific sales factors described in the preceding chapter. Representing all kinds of businesses and industries, such as steel, textile, railroads, food, automobile, etc., they know from experience that while such factors influence the fortunes of specific companies or even particular industries, they are not the determining factors of the whole economy. As a subject of common interest, they discuss business in general. "Business is fairly good," or "business is pretty poor this year," they say.

Interestingly enough, they often agree among themselves on the general business outlook. This is because they are, more or less consciously, discussing the influence of the general economic forces which, unlike the specific sales factors, are, to a greater or lesser degree, felt by all businesses and industries.

It is the purpose of this chapter to inquire into such general eco-



nomic forces and their influences on the sales of a given product by a given business at a given time.

Every businessman knows that his sales will be influenced, for good or for bad, by the economic conditions prevailing at the time. *Qualitatively* speaking, the problem is well understood. When, however, it comes to determining *quantitatively*, with a reasonable degree of accuracy, what sales may be made or lost because of the general economic conditions, the problem is much more complex.

If actual sales at any time are less than expected, is the sales manager really responsible for such a poor performance? Should he not, on the contrary, be congratulated for having done well under adverse conditions and in a difficult situation?

A similar problem arises in forecasting sales. An optimistic sales manager may anticipate a substantial increase in sales and ask for a corresponding increase in production. His optimism is based on a forecast of favorable specific market conditions in that the product has been well received, a competitor has been eliminated, and market research reveals a big demand for the product, etc. Yet, the influence of a general economic recession which he has not taken into account may do more than offset such bright prospects.

It may also happen that the administration is undecided as to the proper interpretation that should be given to a sudden decline in sales. An executive may blame exceptional weather conditions or the fact that Easter was exceptionally late. His conclusion—which would be right if his analysis were correct—is that the decline is purely temporary and that there is no need for drastically curtailing production. Yet the analysis on which the conclusion is based may be completely or partially wrong. The weather conditions, or the date of Easter, may have had no influence or only a secondary influence on the sales decline experienced by the business. The decline may be the premonitory sign of a coming slow-down of general economic activity. If such is the case, drastic action should be taken by the administration to adapt the business to what is a fundamental change in its environment.

In a period of economic expansion also, administrative action is required to prepare the business for an increase in sales.

How can the administration know when variations in sales are due to general economic conditions? How can the future be anticipated if the present is not correctly understood? How is it possible to recognize the parts played by each group: the specific sales factors on one hand, and the general economic forces on the other?

The basic information available to the administration is the sales

record. Sales have gone up or they have gone down and they are or are not up to expectations. This record indicates what is happening, but it does not reveal *why* it happens.

The administration, in order to take the necessary action, needs to know the why. It is true that the analysis of the variations in sales will often reveal the presence of forces which the company cannot control. Such are precisely the general economic forces. This, however, does not preclude administrative action. The wind cannot be controlled either; but the sailor can trim the sails of the ship and bring it safely to port.

The nature of the general economic forces and their relation to the sales of a given product will now be considered.

#### I. COMPLEX NATURE OF THE GENERAL ECONOMIC FORCES, ECONOMIC INDICATORS AND INDEXES

There are a great number of economic forces which, directly or indirectly, to a greater or lesser degree, influence the sales of a given product. Among these—to mention only a few—are: purchasing power, income distribution, savings, credits, the money market, employment, and the population, its increase, age, or migration. It seems at first glance that the number of variables involved is so great that one is tempted to give up the idea of a quantitative analysis of the situation. In fact, what is usually called “general economic conditions” is only a state of affairs rather than the precise measurement, of a given situation.

Actually the presence of definite individual economic forces can be detected and their variations scientifically measured. Indicators and indexes of general economic conditions are regularly made available by reliable government and private organizations.

There are a number of sources from which indicators of general economic conditions may be obtained. The United States Department of Commerce reports weekly, monthly, quarterly, and annually the state of business in terms of the following General Business Indicators:

- A. National income and product
  - B. Personal income by source
  - C. New plant and equipment expenditures
  - D. Farm income and marketing
  - E. Industrial production
  - F. Business sales and inventories
  - G. Manufacturers sales, inventories, and orders
-

It reports also in terms of prices, wages, employment, and other particulars of specific industries and their important divisions. A continuous series of 48 tables of statistics is published regularly in the *Survey of Current Business* issued by the Department.

The *Federal Reserve Bulletin* published monthly by the Board of Governors of the Federal Reserve System reports Business Indexes in terms of:

- A. Industrial production
- B. Construction
- C. Employment
- D. Factory payrolls
- E. Freight-car loadings
- F. Department store sales
- G. Consumers prices
- H. Wholesale commodity prices—

and also statistics on income loans, and many other details of the behavior of the total economy. The Joint Committee on the Economic Report, through its Council of Economic Advisers, selects the following classes of indexes and statistics as the basis for its monthly *Economic Indicators* and for informing the President and the Congress on General Economic conditions:

- A. Prices
- B. Employment
- C. Production
- D. Business activities
- E. Purchasing power
- F. Money and banking
- G. Federal finance.

Other departments of the Federal government, particularly Agriculture and Labor, as well as Commerce, report on general economic conditions by regions, states, counties, etc., and on weekly, monthly, and annual bases. There is no business of any consequence that cannot find among this vast array of statistical tables some one or several which are of particular importance for it.<sup>1</sup> The problems are (1) to explore this wealth of information and to find the ones which are

<sup>1</sup> For a complete description of most of the usual business indicators (their source and statistical characteristics, bibliographic references, historical pattern since their origin, etc.) see Appendix I of *Historical Statistics of the United States, 1789-1945*, U. S. Bureau of the Census.

useful, and (2) to extract their meaning in terms of the trends and variations of the markets to which the business is related; that is, to use them for forecasting the market in terms of current and long-term trends.

The solutions of such problems require an understanding of statistical techniques for the correct interpretation of the data, and a knowledge of economic principles for their application. As an old Texan, standing guard at an airport immigration office, remarked to one of the writers about the highly mechanized airplanes which were landing and taking off, "It ain't just any sheep-herder that can run one of them things."

## II. ECONOMIC TRENDS

It is one thing to measure the variations of simple business indicators, such as the disposable income, or even to measure single economic activities, such as employment, and quite another thing to use such measurements to evaluate, in the complex interplay of all the other economic forces, their probable influence on the sales of a given product.

Experience, however, shows that the various general economic activities, as a rule, tend to follow a common pattern. This provides an approach to the problem.

There are such things as periods of general economic expansion or recession. There are functional or dependent relationships between the various economic activities within the National Plant as a whole. The disposable income, sales of different classes of goods, employment, prices, investments in construction, wages, etc., while they may not vary in the same proportion nor in exactly the same way at the same period of time, do often follow common or generally similar patterns.

Such a pattern has often been called a cyclical trend. The latest research on the subject seems to disprove the regularity that is implied in the word "cycle," which regularity was formerly believed to exist [Mitchell, 1913, 1927, 1941]. The fact remains, however, that there is a general pattern of variation followed by most if not absolutely all the economic activities within the National Plant, even though the variation may not be cyclical in a technical sense.

To illustrate this pattern, a few significant economic indicators have been selected for illustration, namely the factory payrolls index, the department store sales index, the freight-car loadings index, the contract-construction index and the total annual disposable income. These indicators are published by the Federal Reserve Board and the De-

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partment of Commerce. One of them, the disposable income, is given as an aggregate, computed in dollars. The others are in the form of indexes based on various years or periods taken as a reference base such as 1923-1925 = 100 for the contract construction; 1935-1939 = 100 for department store sales and for the freight-car loading index; and 1939 = 100 for the factory payrolls index.

To facilitate comparisons, all these indicators have been recomputed by the writers for the period 1929-1948 as relatives of their 1929 value,

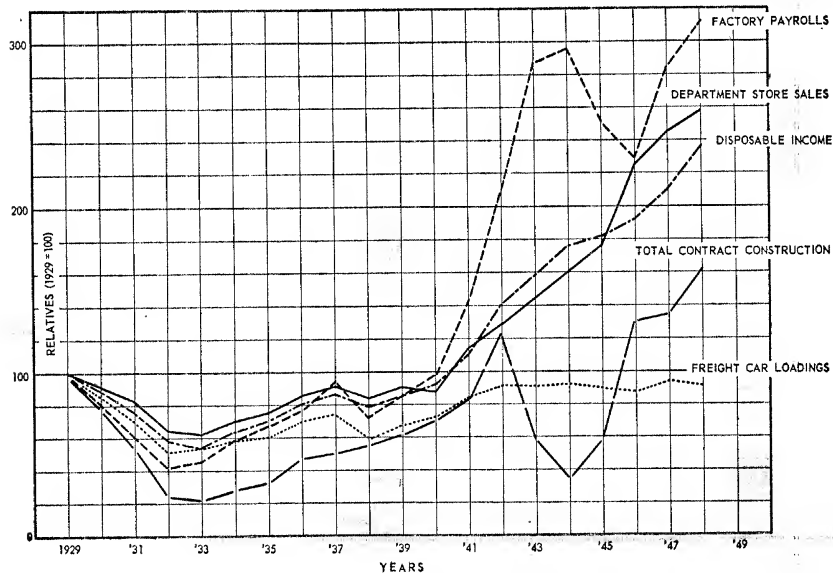


Figure 3. Economic Indicators 1929-1949

taken as the basis. The results of this recomputation are given in Table I and have been used for the preparation of the graph shown in Figure 3.

The graph, Figure 3, illustrates that:

1. Except during a period of deep disturbance such as the war and the postwar period, there was a general pattern of behavior which all economic indicators under consideration followed from 1929 until 1940.
2. Within the frame defined by such a general pattern, each economic activity followed its own specific trend.
3. The differences noted among the trends are observed to be *largely* differences in amplitude and phase.

An *amplitude difference* occurs when the reaction of one economic activity to a change in general economic conditions is more (or less) pronounced than that of another.

A *phase difference* occurs between two trends following the same general pattern when one trend is either preceding or following the other one. This indicates a time lag in their respective reactions to general economic conditions.

For instance, the slope of the down trend of the contract-construction index for the period 1929-1932 is greater than that of the department store sales index for the same period, showing an amplitude

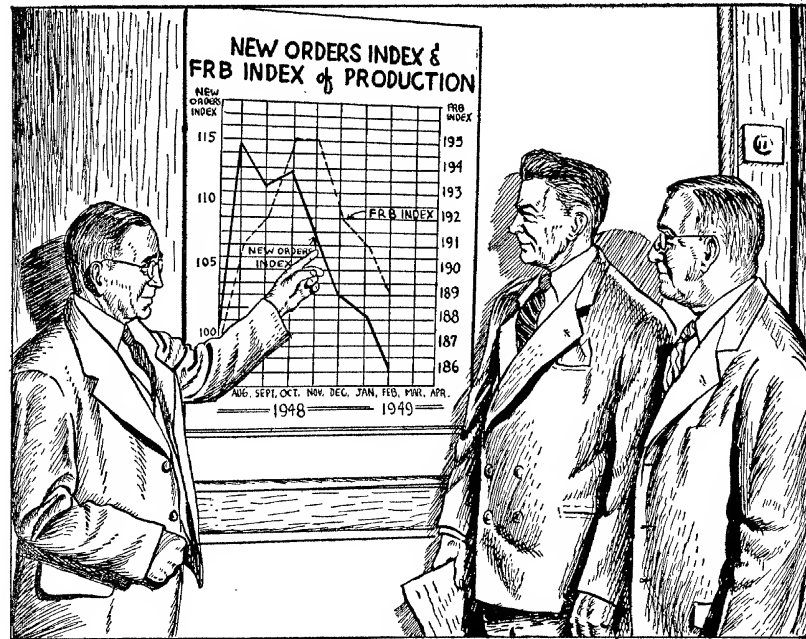


Figure 4. New Orders Index and F.R.B. Durable Goods Index

difference. This amplitude difference is again noted during the period of expansion 1933-1940 during which the contract-construction index increased at a greater rate than the department store sales index.

Figure 3 does not show any clearcut example of systematic phase difference. Such an example is provided by a newly devised and still confidential index, that of the American Supply and Machinery Manufacturers Association.

This association recently announced that its 134 company members

have agreed to pool their information on order-bookings. The index based on the variations of order-bookings seems to show, as indicated in Figure 4, a definite and systematic phase relation of about a month time-lag, to the Federal Reserve Board durable-goods index.

Both indexes have been plotted in Figure 4 for the period July 1948 to February 1949, on the basis of information published in the magazine *Modern Industry* of June 1949.

The usefulness of an index such as that of the American Supply and Machinery Manufacturers Association is obvious. If it continues to show the systematic phase relation shown by Figure 4, it will give the members of the Association, who have access to it, a distinct advantage in forecasting business conditions.<sup>1</sup>

### III. SALES TRENDS IN RELATION TO ECONOMIC TRENDS

The uses of such relationships as the ones just discussed will now be shown. A few words of caution will also be given. In all fairness to the reader, the limitations of the methods presented should be just as much emphasized as their definite advantages and actual usefulness.

1. *General principles.* The principles involved are simple. Experience shows that, generally speaking and keeping in mind the possibility of exceptions, the various economic activities follow a common pattern. It also shows that, within this general frame, each economic activity develops its own trend. Each trend can be defined in terms of amplitude and phase difference in relation to another trend chosen as a reference.

As is easily shown by plotting the sales of any product over a period of years, these remarks are applicable to sales variations as well as to other economic activities. Sales of a given type of goods also developed over the years a general pattern which is similar to that developed by the other economic activities recorded in the form of economic indicators. While the specific sales factors operating in a particular company may cause significant departures of that company's sales from the general pattern they will not, as a rule, affect the line of central tendency. If and when some specific sales factors influencing a particular business have a permanent and systematic character, the actual

<sup>1</sup> The Department of Commerce recently announced that the monthly indexes of new orders for all manufacturing, published by the Office of Business Economics were being recomputed so as to be related to the flow of shipments or sales. The new series are in the form of dollar values instead of indexes. The purpose of the new presentation is to facilitate the use of such data for appraising sales prospects and the business outlook. [Jacobs and Wimsatt, 1949]

sales figures for the company can be adjusted accordingly. Such will be the case, for instance, if a company experiences a significant growth of its market over a period of years (see preceding chapter and also Chapter V). After needed adjustments have been made, the past sales of the product under consideration may be plotted and the trend of sales during a given period compared to that of any of the economic indicators such as those given in Table I and Figure 3. It will generally be found that there is a similarity of pattern. It will also be found that the pattern of one of the economic indicators is more closely similar to the pattern of sales of the product considered. The trend of this indicator will then be chosen as the reference trend.

The following example will illustrate:

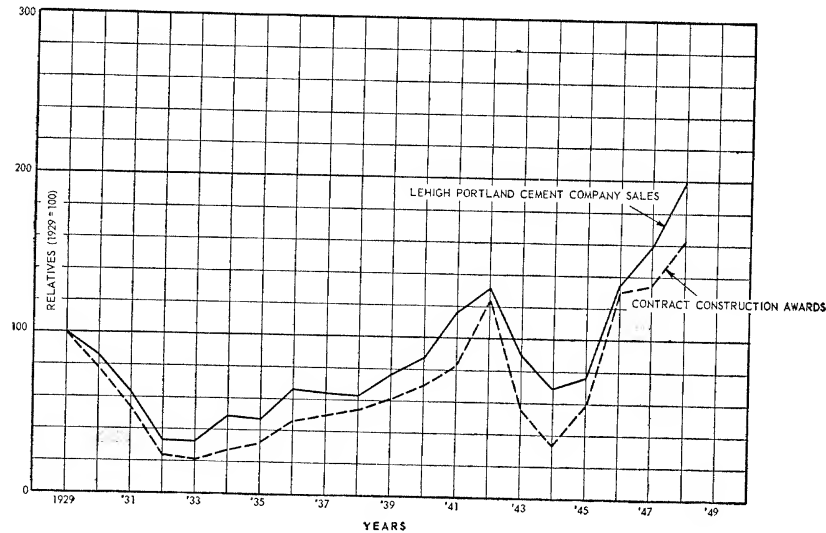


Figure 5. Lehigh Portland Cement Co. Sales Relatives 1929 = 100, and Contract-Construction Awards Index, 1929-1948

2. *The Lehigh Portland Cement Company.* This company's sales for the period 1929-1948 were as given in Table II. To facilitate comparisons with the economic indicators given in Table I, the company's sales are also given in the form of relatives of the 1929 sales taken as the basis.

The trend of the company's sales for the period is shown by the graph in Figure 5. This trend is strikingly similar to that of the total contract-construction awards index, already shown in Figure 3 and which is again plotted in Figure 5. The similarity has been maintained through-



out a period of depression, a period of expansion, and even the war and postwar periods.

It is seen that there is no phase difference between the two trends but that there seems to be a difference of amplitude.

The graph in Figure 5 shows both the general similarities in phase and the amplitude differences between the trends. It does not however, give any immediate measurement of the relationship between the company's sales and the index.

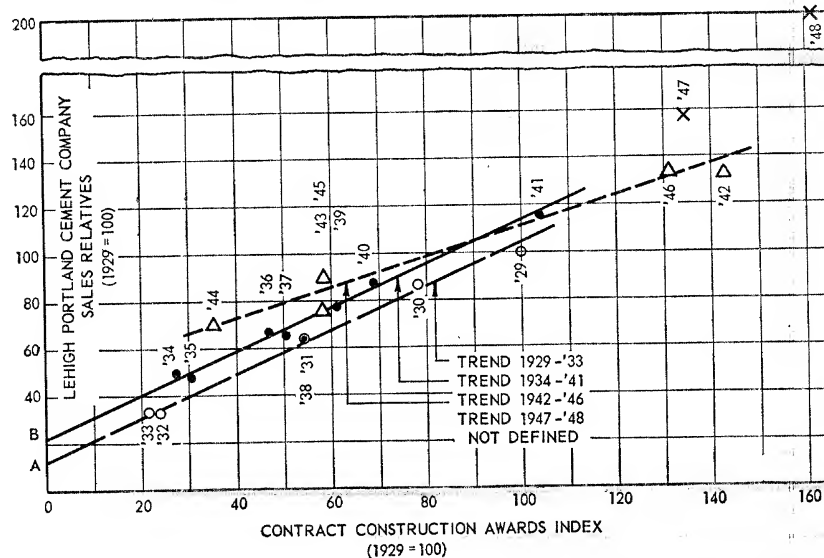


Figure 6. Lehigh Portland Cement Co. Sales Relatives vs. Contract-Construction Awards Index

The authors have found it useful for their purposes to construct a functional chart as the one given in Figure 6. In this chart the index has been plotted as abscissa and the company's sales as ordinates. In such a system of charting the relationship between the chosen index and the company's sales is more specific. It is shown, for example, that the relationship between the company's sales and the index of contract construction for the period from 1929 to 1933 was linear and followed closely the equation of trend,

$$\frac{C}{I} = \frac{56}{60} = 0.93\frac{1}{2},$$

in which C = company sales index  
and I = contract-construction index

TABLE I  
BUSINESS INDICATORS AS RELATIVES \*  
OF THEIR 1929 VALUES

<i>Year</i>	<i>Disposable Income</i>	<i>Dept. Store Sales</i>	<i>Factory Payrolls</i>	<i>Freight-car Loadings</i>	<i>Total Contract Construction</i>
1929	100.0	100.0	100.0	100.0	100.0
1930	89.5	92.5	81.3	86.3	78.6
1931	76.4	83.0	61.4	69.6	54.0
1932	58.0	64.2	42.2	51.3	23.9
1933	54.6	62.3	45.3	54.0	21.4
1934	62.6	70.0	58.5	58.6	27.4
1935	70.2	75.2	67.2	60.5	31.7
1936	80.0	85.5	77.7	70.5	47.0
1937	86.2	91.5	93.3	73.0	50.5
1938	79.3	85.0	72.4	58.6	54.8
1939	85.0	90.8	85.5	66.6	61.5
1940	92.0	87.5	98.0	71.8	69.2
1941	111.0	113.5	143.5	85.5	104.0
1942	141.0	128.0	209.0	90.8	142.0
1943	159.0	144.0	286.0	90.2	58.2
1944	176.0	160.0	295.0	92.0	35.0
1945	181.0	177.0	250.0	89.0	58.2
1946	192.0	226.0	230.0	87.0	131.0
1947	210.0	245.0	284.0	94.0	134.0
1948	236.0	258.0	312.0	90.8	162.0

\* Computed from indexes published in the Federal Reserve Bulletin and Disposable Income by Survey of Current Business, U. S. Department of Commerce.

This means that during the recession period from 1929 to 1933 inclusive, a decline of 10 points in the contract-construction index resulted in a decline of 9% points in the index of company sales.

Next it will be found that during the recovery period from 1934 to 1941 until World War II affected the total economy, the relation between the index of contract-construction awards and the index of company sales, while following another trend, was also linear and parallel to the trend of 1929-1933. The only year out of trend was 1938, a year in which there was an aberration in the trend of most general economic indexes. During the war period (1942-1945) and the reconversion years of 1946 to 1948, the disturbances in the general economy produced a new set of environmental conditions which threw out of bal-

ance the former trend relationship. It remains to be seen if the total economy will in the future adjust itself to a new trend—such as shown for 1943, 1944, 1947, 1948—like the old one but at a different level, or to a different trend. If the company's sales in 1942, 1945, and 1946 were influenced materially by specific sales factors (a matter on which we have no information) which had a negative effect, then the possibility of there being a new postwar trend, as indicated, seems quite likely.

The above illustrations show that not only are there indexes of certain components of the general economy which may be related to the sales of specific types of goods but also that these indexes may be related quantitatively to company sales. It is also shown that these quantitative relationships may vary from period to period and therefore their validity at any time must be tested as to continuity.

3. *Choice of a reference trend.* In the above example, that had been selected precisely for this reason, the choice of the reference trend was easy. A simple comparison shows the similarity between the trend of

TABLE II  
NET SALES OF LEHIGH PORTLAND CEMENT COMPANY

<i>Year</i>	<i>Millions of Dollars</i>	<i>Percent 1929–1948</i>
1929	19.3	100.0
1930	16.7	86.6
1931	12.3	63.8
1932	6.4	33.1
1933	6.4	33.1
1934	9.5	49.2
1935	9.0	46.8
1936	12.8	66.4
1937	12.4	64.3
1938	12.1	62.8
1939	14.8	77.0
1940	16.9	87.8
1941	22.4	116.0
1942	25.3	131.0
1943	17.3	89.6
1944	13.4	69.5
1945	14.7	76.3
1946	25.8	134.0
1947	30.4	158.0
1948	38.4	199.0

the Lehigh Portland Cement Company's sales and the construction-contract awarded index. The functional relationship between both can be expected, as building construction is known to be the main market for cement.

The selection of an appropriate reference trend will not always be as obvious. In fact the choice of the appropriate economic indicator is one of the main difficulties of the problem in which several considerations are involved and a high degree of common sense required. There must be a functional relationship between the economic indicator and the product sold. The sales of tobacco products, for instance, may be rationally referred to the disposable income, but certainly not to the index of construction contracts awarded. The latter indicator will generally be adequate for a study of the sales of supplies to the building industry.

A careful analysis of the past sales performances in relation to various economic indicators with which a functional relationship may conceivably exist is the best approach to the problem.

The choice of the economic indicator will also be governed by purely practical considerations, such as the frequency with which it is published and also its permanency. It has happened in the past that businesses have based their forecasts on economic indexes computed by private organizations which for one reason or another have ceased publishing. To avoid any such disappointment, it seems preferable to choose an economic indicator among those which will, according to all probability, be published continuously for many years to come.

The variations in the value of the money due to inflation have created another problem in relating dollar sales to physical quantity indexes. Indexes based on value expressed in dollars and cents have been inflated with the money. They cannot be used with figures of sales expressed in physical quantities. Some businesses have actually met that difficulty by converting such indexes from dollar units to physical units. This method is followed by a corporation which has done a pioneering work in the field of sales budgeting. Its budgeter currently uses as a reference the department store sales index published by the Federal Reserve Board, which he divides by the retail-prices index (all commodities), published by the Department of Commerce. The resulting index which he calls the United States Department Store volume index is then compared to the sales performance expressed in physical quantities.

For the years 1935-1947, these indexes are as in Table III.

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TABLE III  
DEPARTMENT STORE SALES VOLUME INDEX

<i>Year</i>	<i>Sales Index</i>	<i>Retail price Index</i>	<i>Volume Index</i>
1935	88	98	90
1936	100	99	101
1937	107	104	103
1938	99	101	98
1939	106	99	107
1940	114	101	113
1941	133	108	123
1942	149	125	119
1943	168	134	125
1944	185	138	134
1945	207	141	147
1946	264	155	170
1947	284	180	157
1948	302	191	158

The same budgeter also uses his own combined indexes. The construction of a combined index is advisable in cases where the sales of a given product are influenced by various and complex factors. A study of past sales performances and a comparison with economic indicators may fail to reveal a sufficient degree of similarity in trend, in which case the combination of two or more indicators will often yield the desired reference trend.

Such a reference trend does not need to be identical in all particulars with the trend of sales. A similarity of pattern, characterized by a consistent amplitude or phase difference (or both) is found to be satisfactory. It will enable the budgeter to define a relationship between the trend of sales of the product and the trend of a well-known, regularly published set of economic indicators. This relationship is used both for forecasting and control purposes.

*In summary*, therefore, it may be said that the selection of the indicators or reference trends used for guidance as to the probable trend in sales of a specific product should be made on the basis of the following characteristics:

a. They should be functionally related to the sales of the specific product. For example, the sales of consumers goods from the shelves of department stores is tied to consumer purchasing power while the sales

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of producers goods, such as machinery and manufacturing equipment, will depend on: 1. The amount of new capital issues to be used for plant expansion. 2. The extent to which the accumulated reserves of industry are being used to replace old machinery and to expand production facilities.

The sales of agricultural machinery, on the other hand, will depend on the prosperity of the farmers as evidenced by farm prices, abundance of crops, and parity.

At the present time, the sales of many goods are influenced by the government's spending policy in relation to anticipated national emergencies, and the rehabilitation of foreign lands. Accordingly, the effects on the sales of a given product by the state and trend of the general economy may be forecast by the use of sometimes one indicator and sometimes two or more indicators, provided the activity or activities selected for comparison are those which cause or accompany the variations in the sales of the product being studied.

b. They should preferably be those activities which precede the sales of the product, and are reported on at a date early enough to be useful, such as the granting of contract-construction awards may precede the demand for some building. They must be those activities which are reported on regularly and at sufficiently short intervals, particularly for products in seasonal demand.

c. They should also preferably be those kinds of activities about which the reporting agencies provide reliable estimates of annual or quarterly probabilities on the basis of current events, so as to provide adequate guidance to anticipated sales and in production and inventory control.

4. *Uses of the reference trend.* Whenever such a consistent relationship is well established and whenever there is a phase difference, such as the index trend preceding the sales trend, the use of the index for forecasting is obvious. Such is for instance the case of the confidential index prepared by the American Supply and Machinery Manufacturers Association previously mentioned. (See above, page 42.) Such a kind of index, if published, would probably prove one of the most useful tools for sales forecasting in many industrial fields.

Even without favorable phase difference, the reference trend of an index can be used for forecast of sales, as will be shown in Chapter V. It can also serve as a yardstick for the control of sales performance.

Sales figures vary day by day. It is essential for management to know why they vary, whether because of the sales force performance, or of competitors' efforts, or of general economic conditions. The relationship

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between the sales variations and an economic indicator regularly published will indicate the amount of sales variation that is attributable to general economic forces. This defines responsibilities within the organization and clears the way for constructive managerial action.

5. *Limitations.* The reader should be aware that we have, in the above discussion, entered a field that has not, as yet, been fully explored. A word of caution is therefore in order. There are many obstacles in the way of scientific research in this field. Sales data, even when published, are usually given as a lump total of various kinds of products. As such, they cannot be used. General Motors Corporation net sales in 1948 were \$4,701,770,340.00. This includes Cadillac and Chevrolet, trucks and passenger cars, industrial and consumer goods, etc. Such a figure cannot be used for a research of functional relationship between the sales of a given product and a given economic activity.

At the same time, the various figures and indexes available for measuring economic activity should themselves be used with caution. The index of total production in the U. S. during any year is, to say the least, a number of very obscure meaning. In what units may it be expressed? Only in a very limited sense can one express the idea of two Morgan horses and two Shetland ponies as being in the same group. To say that the group consists of four horses omits many essential differences between the members of the group. Among these differences is that of market price. Each Morgan horse may sell for \$250 and each pony for \$100, and the four together would have a total market-price value of \$700.

If, then, I should state that I had a herd of horses worth \$10,000, this may represent 40 Morgan horses or 100 Shetland ponies.

If, then, the value \$10,000 were used as an index of quantity it would mean one thing if I were in the Shetland-pony business and quite another if I were in the Morgan-horse business. The cost-of-living index is one to be used with caution, particularly over a period of time. In the first place it may be asked, the cost of whose living—the farm group or the urban group, the \$1,000 to \$2,000 income brackets or the \$4,000 to \$5,000 income brackets? The cost-of-living index may increase or decrease in time, yet that does not imply that all groups of the population are equally affected during that time. They may or may not be. The total personal disposable income, as will be demonstrated subsequently, has been found to provide an excellent index to measure the probability of sales of certain types of consumers goods over a given period of years. But when new forces were acting in the economy, such

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as rationing during war time, or new competitive products, such as television sets, were introduced to the market, the relationship between the annual sales of a given commodity and the annual personal disposable income was altered.

Whenever a given number does not *represent* a rational unit such as pounds, or a rational combination of units such as pounds of steam per horsepower per hour, it cannot be used to express a rational relationship between quantities representing any one or combination of such units.

Relationships often contain implications which vary in time and hence numbers expressing such relationship have a changed meaning in time. For example, if between 1890 and 1900 the tons of coal mined per year were related to the horsepower hours generated per year it would be found that the relationship was fairly constant and therefore one, if known, could be used to estimate the other. The constancy of the relationship in this case implies that X tons of coal are required to generate Y horsepower.

Since 1900 more efficient boilers and steam turbines have been developed so that the former relationship between tons of coal and power generated no longer holds, and hence is not useful for estimating purposes. Today from 3 to 4 times Y horsepower hours can be generated from X tons of coal.

Accordingly the validity of a given index as a measure of probable sales must be checked, and particularly at such times when a major event affecting the total economy of the nation transpires.

These words of caution being said, it is a fact that many businesses have been greatly helped in the forecasting and control of their sales by a careful study of their sales trend in relation to economic trends.

It is to be hoped that further research will throw additional light on the subject. Meanwhile, however, the methods already known are actually helpful. The authors have had the opportunity either to see them successfully applied in industry or to apply them in their consulting practice and they trust that, despite their fully acknowledged limitations, they can be of help to the reader who faces the problem of sales forecasting and sales control.

#### IV. SEASONAL VARIATIONS

All economic indicators previously mentioned are published at regular intervals during the year. Some of them are published quarterly, some monthly, some even more frequently. In fact, the more frequently published, the more useful they are. Frequency of publication may

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even be an important element in the selection of an economic indicator as a reference. Thus appears the problem of seasonal variations.

Few businesses are in a position to ignore seasonal variations in sales. Fortunately most businesses develop over the years a general pattern of seasonal variation. This pattern is made apparent by computing the monthly (or weekly, or quarterly) sales in percent of annual sales over a period of years. By using an average percentage, it will be possible to adjust the actual figures of sales for seasonal variation. The adjusted figure is then multiplied by the proper coefficient (12 if it is an actual monthly sales figure) to obtain the yearly sales figure based on the last known performance. This yearly sales figure, adjusted for seasonal variation, is readily comparable to most of the regularly published economic indicators, which are themselves generally adjusted for seasonal variation and computed on a yearly basis.

#### V. REGIONAL AND LOCAL VARIATIONS

These create a more complex problem. The economic indicators previously mentioned are based on a national average. They can be readily used for comparison with the trend of the total sales of a product having a national market. They cannot be readily used for a product having a local market, nor for the forecasting or control of the district sales of a product having a nation-wide distribution. Conditions vary sometimes greatly from one town to another or from one state or one region to another. Population migrations, discovery of new local natural resources, creation or disappearance of local industries may have a very substantial influence on local economic conditions. And there will even be some discrepancy in the variations of economic conditions on each local or regional market.

As this book, by necessity, is limited in its scope, no attempt will be made to discuss fully the problem of adjustment to regional and local variation. It will be sufficient at this point to state that it can be solved by the use of local or regional market indicators that are regularly published. The Department of Commerce has published annually<sup>1</sup> since 1945 detailed statistics on regional and local conditions [Economic Series 67]. The Federal Reserve Board publishes monthly an index of department store sales by Federal Reserve districts which very usefully completes the more detailed but yearly statistics of the Department of Commerce. In addition, special publications are available for each section of the United States (Federal Reserve district, region,

<sup>1</sup> See also: U. S. Dept. of Commerce—*Business establishments, employment and taxable payrolls*. (By industry groups and by counties)—Washington D. C., 1948.

state, city, etc.). A selected list of such publications is given in Appendix B.

In fact, for all businesses distributing consumer goods, the department store sales index by Federal Reserve districts will provide enough information to evaluate with a sufficient degree of accuracy the probable quota of each federal district as a ratio of total sales. Important businesses are known to have revised the limits of their own sales districts in accordance with the limits of the Federal Reserve districts so as to facilitate the budgeting and the control of their sales, district by district, in relation to the local economic conditions revealed by the Federal Reserve district index.

#### VI. CLASSIFICATION OF PRODUCTS ACCORDING TO THEIR ECONOMIC SENSITIVITY

Most modern businesses have more than one and very often a great many lines of products. This creates an additional difficulty in the determination of the influence on sales of general economic forces.

It sometimes happens that the products of a given business differ among themselves as to their shape, color, and use, but that they react identically to changes in general economic conditions. For instance, a manufacturer of plastic goods recently investigated by the authors actually produces more than 200 different finished items. It was found, however, that all of them, being sold to middle-income-bracket customers, on a national market and within a comparatively small price range, react identically to changes in general economic conditions. This will not always be the case. The same business may well produce durable and non-durable goods, consumer and industrial products, luxury and necessary items. Each kind of product will react according to its own pattern to economic changes.

If there are only a few products, it will be possible to consider each of them individually and to determine for each of them the most suitable reference trend.

Such a solution is not practical if there is a substantial number of products. A classification of the products should be made, based on their "economic sensitivity." Such a classification will provide the general frame within which the sales forecast can be prepared. A reference trend is then chosen for each group of products.

The classification of products according to their economic sensitivity, although subject to occasional changes, if required, should be as stable as possible and therefore based on careful considerations and research. The first approach to the problem is to classify the products on the basis

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of what appears to be their general characteristics: consumer or industrial goods, durable or non-durable, luxury or goods of current use, etc. Such a temporary classification is then checked by a study of each product's trend of sales over a span of years.

In the case of a new product, a decision is taken which will be checked in terms of sales experience.

The classification of products on the basis of their economic sensitivity is a fundamental one in a budgeted business. It provides the general frame within which any other required classification should be made. (See page 161 et seq., Sales Mixture Control.)

#### VII. EVALUATION OF THE INFLUENCE OF THE GENERAL ECONOMIC FORCES

After a consideration of the administrative influence on sales, which will be presented in the chapter immediately following, a more detailed consideration of general economic conditions and their evaluation and use in the sales forecast, will be given in Chapter V.

## ■IV

### ADMINISTRATIVE INFLUENCE

**T**HE SUCCESS or failure of a company is in large measure determined by the *policies* adopted by the administration<sup>1</sup> of the business and the *programs* devised to implement the policies. In the matter of sales, especially in these times of great change in domestic and world economies, administrative influence is often most significant and decisive. The restricted areas within which the operating management, under the direction of the general

<sup>1</sup> The word "administrate" means to exercise top-executive authority. The board of directors of a corporation, the members of a partnership, and the proprietors of a business are the administrative authorities. Among their responsibilities are to act as trustees for all the assets of a business both tangible and intangible, to organize and reorganize the major framework of the policies and programs of operations. The management of a business is entrusted to the executives acting under the authority of the administration. Management consists of conducting operations according to the policies and within the pattern of organization prescribed by the administration.

manager, may make decisions affecting the sales of the company's products have been examined in the previous chapter. The areas within which the board of directors, or committees of the board, make decisions as to policies and programs affecting company sales will now be considered.

The days are passing when business can survive a bad hunch on a major sales policy. Sales estimates adopted without the support of data indicating the reasonableness of such a policy are dangerous. Administrators who abstain from their responsibility for making high-policy decisions and place this obligation on the shoulders of the operating executives are a liability. Such executives, concerned with the many details of the business day, do not have acquaintance with the fundamental movements in the domestic and foreign economies which influence the market. Changing markets often require significant adjustments in sales policies and programs, and it is the administrators who should formulate the principal strategy of the sales campaign while the operating executives should be relied on for procedures within the framework of major policy.

What are some of the areas within which administrative influence on sales is most frequently important, and which, when changed in scope, direction, or both, should be considered in formulating the sales budget?

#### *1. Change in type of product*

a. Some years ago a company in Pennsylvania, manufacturing high-speed reciprocating steam engines, found its sales steadily declining. The fact was that the market for the company's product was being supplanted by the steam turbine and particularly turboelectric generator sets. It was also observed that the growing use of automobile transportation was influencing road building and creating new demands for road-building machinery. These two facts determined the directors to examine the market possibilities for a new type of steam shovel, to which their attention had been directed. The new design was particularly adapted to road building as distinguished from heavy excavations for which the steam shovels of that time were designed. After experiments in the operation of the new shovel proved it feasible (and there were many disappointments during this period which at one time prompted the directors to consider abandonment) and a survey of the market which disclosed its selling possibilities, the directors decided to go ahead. This had a pronounced influence on sales of the company and altered completely the whole sales program, including budgeting.

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The company became very successful and was finally merged with another company which now dominates the field of excavating and earth-moving machinery.

b. The directors of a well-known company manufacturing dentists' office equipment and supplies recently adopted the policy of entering the flexible-shaft market to exploit the general application of the flexible shaft which they had developed and successfully used in their dental engines. A decision of this nature would not be made by operating executives because it represented a fundamental change in company policy and further required the appropriation of funds for manufacturing and for marketing the new product. The budgeting of sales for the new product in a different market needed to be based on other criteria than those applicable to estimating sales of dental office equipment and dentists' instruments.

## *2. Change in the character of product*

a. When the directors of a company authorize the redesign of their products to adapt them to a lower price range, as has frequently occurred in the auto and household equipment and appliance industries, the entire sales budget as well as the several types of expense budgets must also be recalculated and new bases for their evaluation must be determined. Such a fundamental change in policy in fact calls for a substantial redesign and new determination of the company's capital requirements and economic characteristics. This redesign and determination should, of course, be made before such a policy is considered for adoption. Without the data which the new economic characteristics portray, policy decisions of the above nature are hunch decisions, and while they are sometimes good, they are always dangerous.

The above examples are merely illustrative of the kinds of decisions which the directors may make in the matter of productivity which have a strong influence on the sales budget.

## *3. Marketing policy*

Marketing policy in such matters as selective sales, dumping on a foreign market (a rather dubious policy which often leads to the loss of markets through restrictive import tariffs), or entering a new territory as part of a policy of expansion are also types of administrative influence which have important consequences in the sales budget.

a. The directors may decide to restrict or expand their offerings in a given market, or to certain groups of customers in that market, any

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of which decisions will alter the basis on which the sales budget is to be estimated. Correctly determined details of the cost of serving certain groups of customers whose purchases are not proportionate to the expense involved may lead to the decision to leave this area of the market to competitors because such business does not pay. This decision on selective sales must be reflected in the sales budget as well as in the corresponding expense budgets.

The problem of selective sales has been given wide attention lately. The resurgence of a buyer's market may induce management to return to the old concept of "volume" rather than to select sales. At the same time, it is a fact that the high cost of distribution will very often justify at least a moderate selection of sales. The problem deserves attention.

The Department of Commerce (Marketing Division, Office of Domestic Commerce) published in 1948 the results of a survey [Sevin] which seems to reveal the general need for selective sales. This survey indicates that, in many cases, the profit obtained from the profitable accounts was very substantially reduced, sometimes even more than offset, by indiscriminate selling. In one case, customers had been classified on the basis of the amount of their annual purchases and marketing costs had been allocated to each group. Of the total number of accounts, 41 percent, bringing in only 7 percent of the sales, were found to be unprofitable. Over a period of years, most of the unprofitable customers were dropped. In a period of 4 years, sales increased 76 percent, marketing expenses were cut in half from 22.8 to 11.5 percent of sales, and a net loss of 2.9 percent of sales was changed into a net profit of 15 percent.

This example, chosen among many others, shows that selective sales does not necessarily mean reduction of sales. By liberating the sales force from its unprofitable efforts with some accounts it may open new markets for the business. This was the case in the above examples where sales increased 76 percent in 4 years of selective selling.

b. Dumping on a foreign market [Eco. Ind. Mgmt., 295] for the purpose of sales expansion, a procedure not conducive to the creation of international good-will, is based on a policy which, while tending to increase sales, often has a "flare-back" when the importing country closes its borders to such products. Accordingly this practice may cause wide variations in annual sales if the proportion of the foreign sales to the total sales of the company is large. It may also demand sudden adjustments in sales budgeting, as when the country being exported to changes its tariff policy or devalues its currency as England recently did, or in other ways restricts its imports.

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c. One of the administrative influences on sales which may have an important effect on the sales budget is that concerned with decisions affecting the channels through which a company's product reaches the market. If the directors decide, upon the recommendation of the chief sales executive, supported by adequate data, to change from distributor representation on a regional or national scale, to maintaining their own district offices and contacting jobbers and dealers through their own representatives, the probable short-term and long-term effects on sales must be estimated and incorporated in the sales budget.

There are many other ways, in addition to these just cited, in which the administrators may affect the marketing policies of a business with bad or good results. The probability that such results will be good rather than bad is greatly improved if decisions of marketing policy are made on the basis of competent market analysis and procedure in sales budgeting.

#### 4. *Advertising policy*

As to scope, media, and extent, this is an important decision to be made by the directors of a company. Whether advertising should be on a national, regional, or local scale; through radio, magazine, newspaper or other media; and how much money should be appropriated in total and in proportion, are often difficult but very significant questions to decide. The total national sales in dollars of a well-established type of product such as clothing [Eco. Ind. Mgmt., 374] is frequently determined by such factors as national disposable income or by other conditioning national circumstances. The net effect of advertising expenditures in whatever form is to affect the company's share of the total market thus determined. The consequences in sales as a result of changes in advertising policy will also depend on the advertising activities of competition. Major decisions on changes in the over-all advertising policy of a company are usually made on an empirical basis and not until there is more scientific research in this field will this basis be changed for the better. At that time the effect on the sales budget of such changes in policy can be estimated with a less probable error than now.

Mr. Edmond S. La Rose, controller of Bausch and Lomb Optical Company, in a paper read before the National Association of Cost Accountants at its Twelfth International Cost Conference, held in Pittsburgh, Pennsylvania, reported a case illustrating administrative influence on sales through the adoption of an advertising policy proposed by Mr. La Rose. We quote as follows.

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I would like to tell you about one of the outstanding items which occurred in the preparation of our 1930 budget. We had started the work of preparing our 1930 budget in September of 1929. . . . We had forecast a drop in general business for 1930 and had completed the sales, cost of sales and gross profit budget for 1930 when the October 1929 break occurred which was greater than anticipated. However, we went to the management and stated our belief that the forecasted reduced cost of sales and consequent increase in gross profit should be used for the first time in our history, as an appropriation for doubling our advertising expenditure, thereby combating the break in general business. We doubled our advertising expenditure budget . . . heretofore, while our business had practically gone up or down or nested with the general business curve, it did not drop in 1929 and kept right on going until approximately Sept. 1930 or for about one year following the start of the depression. Incidentally our courage was strong enough to pay us good reward.

##### 5. *Pricing policy*

Pricing policy concerns two important matters, one of which is dollar sales as well as quantity sales and the other is gross profit margins. These in turn will affect the "sales mixture" in terms of qualities, sizes, etc.

a. A well-known manufacturer of men's clothing is now (1950) facing the problem of the price lines he will offer his customers in the approaching fall and winter seasons. This manufacturer maintains his own stores in the city of New York. He has many regular customers. When employment is steady and wages are high a good percentage of customers purchase in the higher price ranges. As unemployment increases and the cost of living advances over income, these same customers will continue to purchase but in the lower price ranges. The quantity of suits sold to these customers will be approximately the same but the dollar sales will be lower. The gross profit margins for each price range are also different and hence total gross profit will be affected. The components of sales (sales mixture) will shift and hence the yardage of lower quality cloth to be purchased will increase and of higher quality cloth will decrease. These shifts will in turn affect the production schedules of the factory, both as to the quantities and qualities of the several price-range suits to be produced for the coming seasons.

The above case is illustrative of a number of similar ones found in many industries at the present time. Sales budgeting under the circumstances described above will be significantly affected by administrative influence on price policy.

b. A small manufacturer of a line of hand tools was experiencing

losses on one of his new products. His prices were above those of a competitor who dominated the market and yet if the small manufacturer lowered his prices to be in line with competition, the gross profit margin (at his then rate of output) would not be sufficient to absorb administrative and selling expenses. He was faced with a problem of pricing. The department of the plant in which the product was manufactured was operating at about 30 percent capacity. At 100 percent capacity operation the cost per unit of output would be low enough to provide a satisfactory margin of profit even though the price were reduced to be in line with competition. The department could break even at 80 percent capacity at the reduced competitive price. In the light of these facts the management had to estimate the probabilities of increased sales due to price reduction, the time required to build up sales to the break-even point, the losses which would be sustained up to the time when the company would break even, the return on the investment if the company should operate at full capacity, and the probability of cost reduction to improve profit margins. After careful estimates of all these matters it was decided by the management that the risks involved were not justified by the most favorable prospects of profits and the venture was abandoned. In this case the management had the advantage of the competent advice of consultants in marketing and in cost analysis. Had it made a hunch decision and been motivated by that false pride which does not admit defeat, the company may have continued with the new product and may have suffered a serious loss. This case illustrates the fact that one problem such as price policy is bound up with other problems which cannot be separated, one from the other.

Accordingly in all of the above examples used to illustrate some particular aspect of administrative influence on sales, it is to be understood that none of the situations stands out as a clearcut problem concerned only with one particular feature of the whole administrative problem. Almost any of the specific problems of administration has its roots in many areas of operation, no matter how well known the location of the taproot may be. Perhaps the subject of administrative influence on sales may be likened to that of the ship's captain and the problems of bringing his vessel to port. The sea of commerce has many well-charted areas showing rocks and hidden shoals. There are other areas not well charted. All ships that sail the seas are subjected alike to storms and calms, winds and tides, sunshine and fog. These may be likened to the general economic forces of inflation and deflation which all businesses encounter, the ebb and flow of consumer purchasing power, the storms of war and the droughts of crop failure. The course of every business

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is subject to these and other general economic forces generated by and in the economy as a whole just as every ship in its course may be buffeted by a storm or becalmed in a Sargasso Sea.

In each of these circumstances the navigator must make a choice among several alternatives. If he is fully acquainted with his ship and knows how it will respond to sail and helm, and understands the qualities of each of his crew, and *anticipates* well the vagaries of the storm, he as a competent navigator will integrate all of these factors, determine a program of action and give orders from time to time to implement the strategy selected. If the ship is not seaworthy as to the particular type of storm encountered, it will sink, no matter how competent the captain may be. If the ship is seaworthy but not skilfully handled, it may sink also, or be driven out of course, or it may go on the rocks because it is blown into an uncharted area. The characteristics of the ship, and the conditions of the weather and the sea, constitute the boundaries within which the navigator must choose his course and direct his operations. With all the instruments of navigation which man has devised, the charts of the sea, and radio reports on the weather and particular hazards to navigation such as icebergs and derelicts, still there must always be the final dependence on the human factor for bringing the ship to port.

So also in the matter of business enterprise. All the methods of economic analysis, the data from government and other sources, the storm warnings to commerce and trade, and the reports on financial hazards of credit and failure, cannot supplant the element of human judgment nor, indeed, are they intended to do so. These many services to business constitute tools to be used. If used skilfully they define the areas in which the problems of a particular business lie and sometimes the boundaries of these areas. In the final analysis, the success of the business will depend on the choices among alternatives which the administrator makes. The choices made constitute administrative influence.

In some respects administrative influence may extend over a much wider area as, for example, when it decides for or against the use of the scientific method in conducting the affairs of the business, whether such choice is consciously made or eventuates from inexperience or neglect. For purposes of this study it is assumed that the scientific method is accepted and that all the available factual materials relating to sales possibilities and the potentialities of the business to realize such possibilities are being used. The decisions and choices of the administration constitute decisive influences.

In consequence of the above observations it will be helpful to gain a

clear understanding of the scientific method and its bearing on administrative influences as to sales.

Many people who have not given the subject much thought have the idea that the scientific treatment of a matter must result in a specific single quantitative answer which is sometimes referred to as an exact solution of the problem. This is far from the case. Even physicists and astronomers skilfully using the most carefully designed instruments find that their results must be expressed in terms of a probable error of observation. Mechanical engineers, using the best available scientific data for estimating the probable performance of a steam turbine, for example, are aware that the results of their computations contain a probable error of estimate. Civil engineers in designing a building often use highly refined and complicated formulas in computing the elastic properties of the structure, even though they introduce a factor of safety to account for the probable strain and resulting stress of loading conditions not supposed to be encountered in the intended use of the building. In all these instances the scientific method is being used. The automobile designer employs the scientific method in the design of the engine but he does not guarantee the fuel consumption. He can state that under a given range of conditions, the fuel consumption will probably lie between certain limits which he can estimate.

Alexander Graham Bell, the inventor of the telephone, used the scientific method in developing a better breed of sheep in terms of yield of wool. His calculations did not tell him that a given sheep would yield a specific poundage of wool but they did show him that if he did certain things in breeding sheep the results would be positive in terms of yield of wool. The doctor using the scientific method can inform a particular patient that if he keeps his blood pressure between certain upper and lower limits, the hazard to his health from this source will be at a minimum. By the scientific method the soil physicist has discovered that a sour soil needs lime and that a lack of phosphates will lessen the availability to the plant of the nutrients in the soil.

The scientific method is followed when the data known to be related to a given situation are systematically assembled and the significant relations among the phenomena represented by the data are discovered and formulated. Even though all the data pertinent to the situation are not known or available, still the use of available data as above described constitutes scientific procedure. If the data are meager and *all* the related circumstances are not accounted for, then the probable error of estimate is relatively large. Still the results are scientifically attained.

As more information about a given situation becomes available, and

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its relationship to the previously known information is properly evaluated, then the probable error of estimate is lessened.

The driver of a twenty-ton truck from Chicago to Baltimore is using the scientific method when he relates his average speed to the mileage to be covered and determines that, barring a flat tire or other unforeseen event, he should reach his destination on the morning of a certain day. Because he cannot state definitely that he will arrive at his unloading point precisely at 10:25 does not indicate he has not used the scientific method in timing his trip. He also uses the scientific method of administrative control when he determines the several routes between Chicago and Baltimore, eliminates those which have bridges on which 20-ton trucks cannot be safely used, and selects that one which best serves his needs and preferences. Many of the elements of choice in this situation do not involve the use of numbers yet they fit within the framework of the scientific method.

Let us now apply the above observations to the problem of administrative influence with respect to sales. In the first place, the administration must provide the organization and personnel which will furnish the data derived from the specific sales factors and the general economic factors outlined in the preceding chapters. Without the data required for decision making, the administration is in just as great a dilemma as the captain of a ship would be without the data he needs to chart his course.

In the next place, the administration must know the economic characteristics of the business, its potentialities and its limitations, just as the captain of a ship must know the capabilities of his ship and its limitations of maneuvering. With these two groups of information concerning the business and the environment it faces in its future operations, the administration must decide the methods to be employed in meeting the problem of sales and the means it will provide to express its methods in operating procedures. The data, when properly prepared and organized, will disclose a range of probabilities and it is the administration's responsibility to make the choice which in its opinion will enhance profitable sales.

The final results in sales will never be exactly as budgeted. But the error of estimate has a much greater chance of being less than would result from the use of unscientific methods of forecasting sales and decidedly so if sales are permitted to develop according to the conditions of the market place or to the daily manipulations of the selling force.

The administration must provide the selling force with the "tools"

to work with and direct its efforts in various ways. Without adequate "tools" and competent support the best selling force in the world cannot adequately establish or maintain a company's position in the market. On the other hand, "closing a sale" is often a person-to-person affair in which salesmanship is important. Therefore, competent administrative influence and good salesmanship must support each other if an adequately determined sales budget is to be realized. There are occasions, of course, when administrative influence may be decidedly negative and may lead a company to disaster. But the probabilities that such will be the case is very slight if the policy of the company is to base its methods and means of sales budgeting on scientific principles.

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## FORMULATION AND MEASUREMENT

**I**T WILL BE HELPFUL toward understanding the problem of sales forecasting to describe the steps of the process.

### PROCEDURE IN FORMULATION

#### ANNUAL SALES BUDGET

Let us assume that the sales of a given company for the year just closing are a certain quantity ( $S_p$ ). The sales manager, with whatever assistance he has at his command, weighs all the specific sales factors as described in Chapter II, and comes to the conclusion that next year's sales should be budgeted at some quantity ( $S_p \pm F$ ) where  $F$  represents the *quantity variation* from last year's sales. This is the sales manager's estimate of what the company should sell during the next budget period.

A conference then takes place between the economist and the sales manager at which the economist, from his determination of general

economic trends, states that the estimate of the sales manager should be increased say 10 percent, or he may state that the general economic tendency indicates a fall of 5 percent in national sales of the product the company manufactures and the company will probably be experiencing a similar decline in its budget expectations.

Under this latter consideration the budget will be modified percentagewise and become  $(S_p \pm F) \cdot 95\%$  or in general  $(S_p \pm F) \cdot E$  where  $E$  is the *percentage* modification of the budget made in consideration of the influence of the general economic conditions. The estimate is now placed before the board of directors of the business for consideration. If, in view of the probability of a decline in sales, the board decides to adopt measures to improve sales prospects and estimates that these measures when taken should increase sales 10 percent above the budget proposal placed before them, the budget finally adopted will be  $(S_p \pm F) \cdot E \cdot 110\%$  or in general

$$S = (S_p \pm F) \cdot E \cdot A$$

in which

$S$  = budget sales

$S_p$  = the sales of the year just closing

$F$  = estimated quantity variation from  $S_p$  to be anticipated because of specific sales factors

$E$  = estimate percentage of realization of  $(S_p \pm F)$  which is due to general economic conditions

$A$  = estimate percentage of realization of  $(S_p \pm F) \cdot E$  due to the effect of administration action

#### DETAILED FORMULATION

##### 1. *Components of the specific sales factor (F)*

The specific sales factor has several components which, as noted in Chapter II, generally fall into three groups. Accordingly, it may be stated that

$$F = \pm a \pm c \pm g$$

in which

$a$  = the adjustment factors, of which there may be several, depending on the circumstances attending sales which call for adjustments to last year's sales.

$c$  = the change factors, of which there may be several.

$g$  = the growth factor accounting for the influence on sales through the growth dynamic of the business and the in-



ductive effect of the developments in the industry of which the company is a component part.

## 2. General economic influence

The influence of the economic trends in the total economy on the sales of a specific product, and in turn on the sales by a given company manufacturing and distributing the product, may be formulated as

$$E = f(x, y, z, \text{etc.})$$

in which  $x$ ,  $y$ , and  $z$  may represent such variables as prices, supply and effective demand, etc.

In most cases, either a single index of economic activity with which the use of a company's products is associated, or a compound index of several economic variables related to the company's business may be used for estimating the probability of a given percentage increase or decrease in company sales due to general economic conditions. Accordingly

$$E = f(T)$$

that is,  $E$  is a function of a trend indicator such as described in Chapter III.

## 3. Administrative influence (A)

The quantity  $A$  is a percentage greater or less than 100 applied to the budget proposals to express the probable effect of administrative decisions.

The value of  $A$  may therefore be said to be a function of human judgment. As such, it may be stated that

$$A = f(J)$$

The final and more detailed formulation of the relation between last year's sales  $S_p$  and future sales  $S$  is written,

$$S = [S_p + (\pm a \pm c \pm g)] \cdot E \cdot (A)$$

If, for example, last year's sales of a company are  $S_p = \$10,000,000$  and it is determined (by methods about to be described) that,

$$a = - \$1,000,000$$

$$c = + \$2,000,000$$

$$\text{and } g = + \$1,000,000$$

then

$$S_p + (\pm a \pm c \pm g) = \$12,000,000$$

If the economist concludes that E should be 95 percent due to a downward trend in general economic conditions, the budget proposal placed before the directors becomes

$$\$12,000,000 \cdot 0.95 = \$11,400,000$$

Should the directors decide to combat the downward trend, reported by the economist, by increased advertising or by other means, the budgeter may reach the conclusion that the budget proposal should accordingly be increased by 10 percent. Thus  $A = 110\%$  and the sales budget as finally adopted will be

$$\$11,400,000 \cdot 1.10 = \$12,540,000$$

The final formulation of the annual sales budget is therefore,

$$\begin{aligned} S &= [\$10,000,000 + \$2,000,000] \cdot 0.95 \cdot 1.10 \\ &= \$12,540,000 \end{aligned}$$

What has been so simply stated above represents the essence of compilations and analyses of a mass of data, relating to the towns, districts, and regions where the company's products are sold and derived from the company's own records, from government and federal reserve bank reports and from other sources.

We will examine some of the principal aspects of the problem of data compilation.

#### 4. *Regional sales*

One of the first things to bear in mind is that a sale is made only when a consumer takes the product from the merchant's shelf. If a manufacturer sells his products to a distributor who maintains a warehouse from which he supplies dealers and the goods remain on the dealer's shelves for several months before a customer purchases them, the time lags between the manufacturer's "sale" and the real sale to the consumer may give a false perspective of the rate of either increase or decrease in consumer demand. Orders booked from distributors on a "take-down" basis may also give a false perspective of the prospect of real sales of a company's product. In the case of perishables this problem does not exist, nor does it exist in many durable and semi-durable goods industries. If the company manufactures an intermediate product, such as fractional horsepower motors which reach the consuming public in refrigerators, oil burners, sewing machines and many other household and industrial products, the "sale" of such motors to a manufacturer in Buffalo, for example, gives no indication of consumer

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demand in Omaha where some of the products of the Buffalo manufacturer are finally sold to the consumer. Also, regional economic conditions in the Buffalo district may not apply to the Omaha district (a failure in the wheat crop, for instance) and hence should not be used as guides to effective consumer demand as defined by the "sale" of motors in Buffalo. A company manufacturing and distributing products on a limited regional basis, such as skates, and not on a national basis, such as breakfast food or spectacle frames, must take this fact into account in estimating the future annual demand for its products. In general, whatever the nature of a company's market, national or regional, direct to the ultimate consumer or indirect through the products of other manufacturers, the total annual sales budget should be built up from the regional budgets (Federal districts, company's sales districts, or other convenient subdivisions of its sales territory). Each region must be analysed separately, for which purpose all pertinent data relating to the sales in the different sections of the United States should be individually and systematically compiled. [See Appendix B for list of sources.]

#### 5. *Seasonal variations in sales*

The annual sales budget should also be broken down into quotas of monthly or quarterly sales. This break-down is essential to the proper estimate of manufacturing schedules, to the preparation of the various income and expense budgets, and for control purposes. In the manufacture and sale of beet sugar, for example, the production of sugar takes place during the fall and winter months because of the perishable nature of the crop, the refined sugar is either warehoused and sold throughout the year or it may be sold to a distributor who assumes the risks of the market. In this case the sales budget is based on the contracts made with the growers of the region in which the mill is located, an estimate of the tonnage which will be delivered and an estimate of the sugar content of the crops grown in the different districts.

Seasonal variations in the sales of summer and winter goods, as in the case of clothing, sports equipment, etc., etc. are important to all manufacturers of such goods from the standpoint of sales budgets, income and expense budgets, manufacturing schedules, and control purposes.

#### *Summary*

The annual sales budget of \$12,540,000 in the example given on pages 69-70 may be the summation of the annual sales estimates of four

regions into which the company's sales districts are divided. This summation may appear as follows:

<i>Region</i>	<i>Sales Budget 1950</i>
1	\$2,000,000
2	5,160,000
3	4,180,000
4	1,200,000
Total	<u>\$12,540,000</u>

The seasonal variations in total annual sales may appear as follows:

<i>Month</i>	<i>Sales Budget 1950</i>	<i>Percent</i>
January	1,329,240	10.6
February	1,304,160	10.4
March	1,128,600	9.0
April	1,065,900	8.5
May	915,420	7.3
June	877,800	7.0
July	815,100	6.5
August	802,560	6.4
September	902,880	7.2
October	965,580	7.7
November	1,103,520	8.8
December	1,327,240	10.6
Total	<u>\$12,540,000</u>	<u>100.0</u>

If these are plotted in percent of annual sales as shown in Figure 7 not only do we have a helpful visual presentation of sales variation but a graphic record is also provided for use in the comparison of

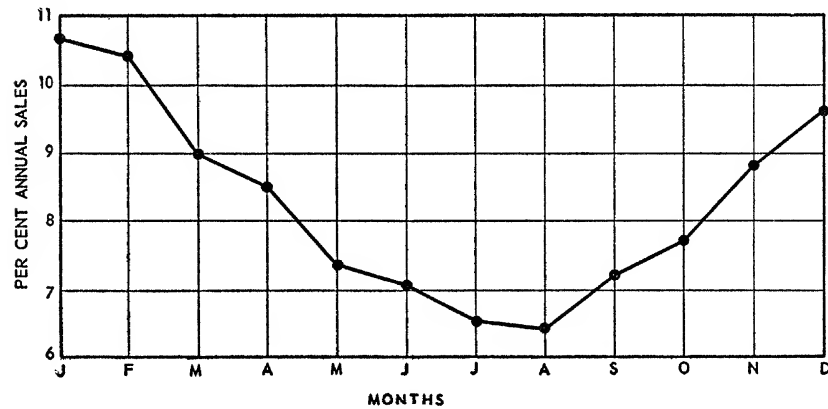


Figure 7. Monthly Percent of Annual Sales

actual sales with estimated sales. In some businesses it may even be helpful to construct such a control chart for each district or region.

The matter of control charts will be more fully described in subsequent chapters.

#### 6. *Budgeting sales on a quantity basis*

The budgeting procedure described above is based on dollars of sales. But dollars of sales are in turn based on quantities and unit selling prices. If the company's price schedules are fairly stable, then dollars of sales may easily be converted into numbers of units sold. But often this is not the case, in which event it becomes necessary, particularly in relating the sales budget to the manufacturing schedule, to prepare sales budgets in terms of quantities as well as dollars.

#### 7. *Orders vs. sales*

The preparation of the sales budgets for some businesses is intimately related to the backlog of orders. This is the case in those businesses in which the product is manufactured over an extended period of time and the time span between booking the order and shipping the product (sales) is an important factor in sales budgeting. The General Electric Company, for example, can manufacture a large steam turbine designed especially for a certain power company, only when the order for such a turbine is received many months in advance. A rise or a decline in the backlog of orders for such products determines the sales or income budget far in advance. A current-income budget in such instances may have little relation to current orders.

In anticipating its future sales a company manufacturing a standard product which is sold direct from the dealers' shelves, should also take account of the time lag between orders and sales. Accordingly, if in such businesses the orders received from the dealers begin to decline, the effect of such a decline will be reflected in deliveries either one, two, or three months ahead, depending on the company's experience.

Therefore an "orders received record" will have a specific phase relation to orders shipped (sales) and will constitute an important source of data anticipating sales variations from previously prepared budget estimates. Such variations do not necessarily but may require adjustments in the production and the expense budgets as shown in Chapter X, page 184 et seq.

#### 8. *The sales budget of a multi-product business.*

*Products classification according to their  
economic sensitivity*

The attentive reader has certainly noticed that, up to this point, reference was constantly made to the fact, or it was implied, that the sale of *one* given product was being considered. Indeed, some businesses sell only one product, as, for instance, cement, yeast, or sugar. Today, however, many, or rather most, of them sell many different kinds of products. They are multi-product businesses. Westinghouse, General Electric, General Motors, Dupont de Nemours, Squibb and Sons; in fact, almost all of the well-known big corporations and many less-known ones are multi-product businesses.

Sometimes the multi-product business can, from the point of view of sales forecasting, be treated just as if it were selling one product only. This is the case if all the products sold have the same economic sensitivity, i.e., react similarly to the variations of the general economic forces described in Chapter III. This enables the forecaster to use the same economic indicator as a reference trend for all the products. Such will be the case, for instance, in automobile cushion-spring manufacture, except as to de luxe models. The springs may vary in type, models, size, and even prices. But they are all sold to car manufacturers. The difference in prices is not substantial enough to justify a differentiation among them. Their sales will vary with the general economic conditions, but the influence of the general economic forces will be substantially the same in the case of each type of product. The same economic indicator can be used for all the springs sold. This does not imply that the same percent profit is made on each size and type of spring. A differentiation in this respect may be needed for the purpose of controlling the "sales mixture" as will be seen later on (see page 156), but no differentiation is required for the purpose of forecasting, because all types of springs have the same economic sensitivity.

The same is true for many other multi-product businesses, such as some types of hardware, plastic, or appliances manufacturers. In most cases, however, the situation will be fundamentally different.

The Bausch and Lomb Optical Company manufactures more than 200,000 different items, the wholesale prices of which range from 30 cents a unit for lenses up to \$50,000 a unit for some optical instruments. Obviously the sales of the lenses and the sales of high-priced optical instruments will react differently to variations in the general economic conditions. Among the Bausch and Lomb products industrial sales will follow the trend of industrial employment while microscopes, analyzers and polarizers, hemacytometers and other instruments for laboratory research do not do so. (See Appendix C.)

Even if production is less radically diversified than in such an ex-

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tre case, it will often be found that the sales of the various products react differently to the influence of the general economic forces.

If a comparatively small number of products are manufactured, up to five or ten for instance, no special problem arises. The methods previously indicated can be applied to each as if it was the only product manufactured by a uni-product business. Sales of a car such as the Mercury, for instance, are directed to the middle-income brackets and have an economic sensitivity that differs from a comparatively expensive car such as the Lincoln. The budget of the total sales of a corporation manufacturing only a few lines of products, such as the Ford Corporation in this case, can be considered as made of two (or a few) component parts. Each part of the total budget is a self-sufficient budget in itself. No special method of product classification is required.

Such is not the case, however, if a substantial number of products are manufactured: hundreds or thousands—not to speak of hundreds of thousands. It would be obviously senseless to attempt finding one reference trend for each item. In such cases, the items should be grouped together and a separate reference trend determined for each group. Thus a problem of classification arises.

Products are classified in the engineering department according to technical characteristics. For instance, there may be a metal division and a plastic division within the engineering department.

For the shipping department products are “fragile” or “rugged.” For the fire department, some create a special fire hazard and some do not. For the salesman who carries samples, some are bulky, some are not; some are “easy to sell” while others are slow moving. The purchasing department which has the responsibility of the raw material inventory, the safety engineer, the workman on the bench, almost every member within the organization has his own formal or informal classification of products according to the purposes such classifications will serve.

The budgeter knows essentially two classifications. One which will be described with more details later on (see page 161 ff.) is based on the profit made on each item. It is used essentially for sales-control purpose. The other, essentially used for the purpose of sales forecasting, will now be considered. It is based on the economic sensitivity of the products.

The sales manager when reporting on the specific sales factor (described in Chapter II) must start at the base. He will generally work on his estimates item by item. If there is a substantial number of items, he will report by groups of items, so as to facilitate the reading and the discussion of the budget.

He will have the choice among various kinds of groupings: according to the type of products, the price ranges, the sales districts, etc. All these classifications may be helpful to him and he should be permitted to use them at his convenience. But he should be asked to organize his own classification within the frame of a primary one, based on the economic sensitivity of the products. This will greatly facilitate estimating the influence on sales of the general economic forces described in Chapter III.

In such a case, all the items included in one group will follow the same pattern of variations when economic conditions change. It will thus be possible to assign one economic indicator to each group and to evaluate the influence of a change of economic conditions group by group instead of item by item. In one instance known to the authors, many thousands of items were grouped in eleven classes. It would not have been possible to measure the relationships between the economic sensitivity of many thousands of items and the pattern of economic indicators, but it was very practical to measure such a relationship for eleven classes of product.

The results obtained will depend on the degree of homogeneity of the products within the group. They must develop very similar patterns in relation to changes in the general economic conditions.

Some groupings according to economic sensitivity are easily distinguished. Generally speaking, consumer goods should be segregated from industrial goods, and durable goods from non-durable goods, luxury items from low-priced items, etc. etc.

It may, and indeed it will, happen that some groupings are less easily discerned. In some businesses, having many lines of products, it has taken years of research, trials and errors before the groups were satisfactorily established. Periodical revisions may even be needed because the components of the economic forces in the total economy and the economic sensitivity of one product as well as its reference trend may also change. Such revisions should be conducted with care and moderation. One of the big assets of the budgeter is the consistency of his records over the years. Groupings and classification should be maintained as consistently as possible so that the data can be validly compared over the years. If changes become unavoidable, they should be carefully recorded and some formula of adjustment worked out, by which comparison between old and new data can be made possible.

The experience of many businesses shows that, with the help of consistent records and of such a classification of products based on the similarity of their economic sensitivity, sales forecasting within reason-

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able limits of accuracy is an actual possibility. Stabilization of production and all its beneficial consequences are the reward, as will be shown in the following chapters.

The formulation of the sales budget of any company involves, to a greater or less degree, the types of problems described above. The details of the procedure best adapted to the requirements of each company will vary over a wide range and necessitate the use of different forms, files, records, and charts, each of which should be designed to meet the particular requirements of the business. Some of the details of procedure and some of the forms, records, and charts used in specific situations will be illustrated in those chapters which deal with the budgeting of sales and other particulars of operations of selected companies. It is apparent that an excellent procedure, comprehensive in scope, rational in structure, and specific in form, may yield disappointing results if the data used are incorrect or, if correct, the relationships among the data are not correctly interpreted. Accordingly, the selection and use of data in the measurement of the sales phenomena is of great importance and will now be considered.

### PROCEDURE IN MEASUREMENT OF SPECIFIC SALES FACTORS

#### 1. *Adjustment factors*

The first step in forecasting sales is to adjust last year's sales by an amount which will account for the circumstances which either increased or decreased sales from what they would have been had these *special* conditions not been encountered. To facilitate this adjustment and to assure that no items are overlooked, a separate record of such accounts should be kept, and the judgment of those who are in close contact with the account should be sought. One of the procedures which the writers have found effective in making such adjustments is to have each local, district, and division sales manager furnish an estimate of the adjustments to be made in the accounts under his supervision as part of a complete budget estimate on sales. This measurement, then, in the final analysis is based on human judgment, which is often very good if the boundaries within which it is to be exercised are closely defined and the sales manager is experienced in the business. The importance of the special record of "adjustment accounts" is that it specifies the boundaries. This principle of establishing categories of factors which affect or influence sales, and the deter-

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mination of the boundaries of each category in terms of probable increases or decreases from last year's sales, is basic to the whole procedure in sales forecasting as developed by the authors.

In the first place, it defines the area of responsibility of the sales manager, the economist, and the administrator. In the second place, it provides specific groups or classes of influence which are of a different character within the boundaries of which judgment is to be exercised. It is based on the scientific method of definition, classification, analysis, evaluation, and formulation.

## 2. *Change factors*

The principal changes which concern the sales manager in his estimate of sales for the next budget period are, as noted in Chapter II:

- a. Product changes
- b. Production changes
- c. Market changes
- d. Marketing changes.

Each type of change in the product (new adaptations, new forms or types, and new items), in the price of the product and in its marketing, to mention a few, is adopted in the hope of increasing sales and profits. If the investment and expenses incurred in such changes are to be justified, some rational method for evaluating their effects on income and profit must be used. How are such measurements to be made?

There are in general two procedures, either one or both of which may be followed. One procedure is the analysis of known data; the other is the accumulation of data by sampling techniques and the analysis of such data. Of course, there is another method, not recommended, and that is the crystal-ball method. It works sometimes but it has a large probable error of estimate. The method of analysis of known data for estimating the change factor in sales attending a new adaptation of a well-established product is illustrated by the following experience.

The sales manager of a large company manufacturing rare gases proposed that the company market neon-tube automobile license plates as a means for increasing the sales of neon gas. While this proposal was being enthusiastically discussed by the crystal-ball method, an engineer in the group was quietly estimating how much gas would be required if 30 million autos and trucks with rear and front plates would be equipped each year with such signs. Upon completing his calculations he quietly announced that the quantity of gas required could be produced in the company's plants in about 30 minutes. The discussion was ended then and there, by the simple process of using known data.

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Another example of the use of known data in estimating the probability in sales following a change in sales conditions, is that used by one of the writers when he was the chief executive of a food-ingredient manufacturing business. The data of the industry showed that this food ingredient was consumed at the rate of 200 pounds per thousand of population per month. The company's records showed that when the company began operations in a new community it required on the average X years to capture Y percent of the market. The records of the company also showed that on the average a branch office had to have Z pounds per month sales in order to break even, that it would require a given period of time to reach the break-even point, and that the losses up to the time when the business became profitable could be determined. With these data, the problem of opening up new branch sales offices and the budgeting of anticipated sales became one, not of pure speculation but of human judgment within an area of probable value which formulated experience provided.

The method of analysis by sampling is very valuable for measuring sales probabilities. A few examples will suffice to illustrate the application of this method of measurement.

A certain large cigar-distributing company, before opening a store in a given locality, will count the number of people who pass the contemplated location during certain hours of the day. Their experience records show that the number thus obtained is definitely related to sales, to the inventory to be carried, and to other features of operation. With these data, the sales manager can estimate with reasonable accuracy the increase in sales due to the opening of a new store. This method of sampling which this company uses also includes other factors to account for regional differences, ethnological differences, character of the neighborhood, etc., etc.

A company which had developed a new product that could be used by housewives in making jelly, sampled the market by stocking the new product in stores in five cities of different size and in selected areas. The records from the experiences in these cities, such as the rate of growth in sales, the time required to stabilize sales, quantities per customer, etc., provided the basic data from which the sales of the new product could be forecast.

A publisher recently had under consideration the publication of a book which he believed would be in demand by business executives. He was faced with the problem of style, format, and price. Would it be more profitable if sold at \$10, \$5, or \$2? A sampling was made through offering a \$10 edition in one region, a \$5 edition in another,

and a \$2 edition in another, to determine the relationship of quantity of sales to unit profit in each case. This, together with an estimate of the market potential at each price, provided the publisher with the information needed for judging the risks involved in this venture.

The effect on future sales due to product change and production change should proceed as to measurement by:

1. Tabulating on convenient forms all changes of the above nature which will be in effect during the next sales period for which the budget is being prepared.
2. Selecting the best adapted method of measurement as indicated above.
3. Making the estimate for each change with such assistance from the economist as may be required.
4. Applying the factor of judgment in the light of all the factual evidence in each case.

In some cases the time required in making a market survey is too long to permit the results of such a survey to be used in current budget estimates. This is often the case when a product change is to be put into effect. Then the sales manager must steer his course as the sailor under similar circumstances would do, and that is by dead reckoning. This usually is not a hazardous venture. However, when a new marketing method is to be used, or a fundamentally new product added to the line, or a new territory is to be exploited, it is extremely hazardous to inaugurate such changes without thorough market analyses. Sales estimates concerning such changes, if adopted, can easily occasion investments and expenses which cannot be supported by the realized sales. It is an open question whether such market analyses should be conducted under the supervision of the sales manager or the economist. Much depends on the background and training of the sales manager and also of the economist. In whatever division of the organization they may be placed, market analyses are an essential part of the problem of estimating the change in sales to be expected following a change in any of the circumstances mentioned above. The market analysis is the process of rational measurement in this area of sales forecasting.

3. *Current growth factors*  
and
4. *General economic trend*

The current growth factors may be related to the industry considered or to a given business within the industry or to both the industry and the business.

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a. *Measurement of the growth of an industry as a whole.*

The toy industry has been experiencing during the last decades a very substantial growth which was recently the subject of a remarkable study by the Department of Commerce [Moore, 1949]. From this study the following data and information relating to the growth of the American toy industry are extracted.

In 1909, the industry consisted of 310 manufacturers with 10,605 wage earners. Its production was valued at \$17,069,000.

Profiting by the diminished competition from foreign-made toys during the war years 1914-18, the toy industry produced in 1919 \$70,163,000 of goods (or four times as much as in 1919). The industry, during the same year 1919, employed 20,887 wage earners in 644 establishments.

During the business depression of the 1930's the industry's volume of production declined from the 1929 peak of \$103,647,000 to \$48,206,000 in 1933—a decrease of 53 percent, slightly less than the 55 percent decrease suffered in the same period by industry as a whole.

No production data are available for the war years.

In 1947, the toy industry consisted of 1,334 establishments employing 40,833 workers engaged in production or related activities.

The value of toy manufacturers' shipments in 1947 was \$337,556,000, almost four times the value of 1939 production (\$86,707,000), reflecting higher prices and also a considerable gain in physical volume of merchandise produced (partly accounted for by an increase of the export market).

To measure its growth factor, the Department of Commerce compares the toy industry's production to the total production of the manufacturing industries from 1909 to 1947. The result of this comparison is shown in Figure 8.

The reader who is familiar with functional charting will find in Figure 9 another method of measuring the growth trend. In Figure 9, the value of all manufactures (in billions of dollars) for the period 1909 to 1939 is plotted in abscissa and the value of toy manufacture (in millions of dollars) for the same period is plotted in ordinate.

The trend line as determined includes the 1947 data which is not shown in Figure 9 because of space limitation.

The year 1947 is the only postwar year for which data are available at this time. It is seen that the toy industry enjoyed a fairly regular trend of growth. This trend is linear and its equation is:

$$y = 1.9x - 20$$

in which:

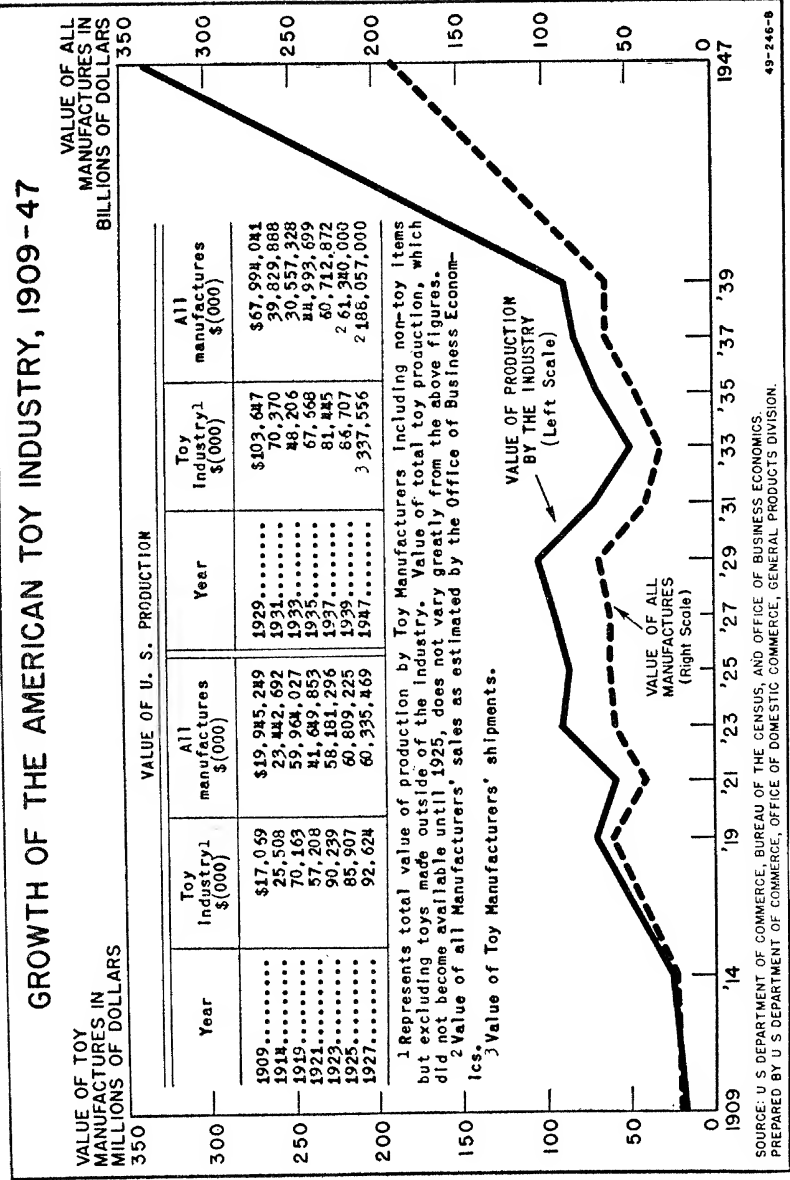


Figure 8. Growth of the American Toy Industry, 1909-1937

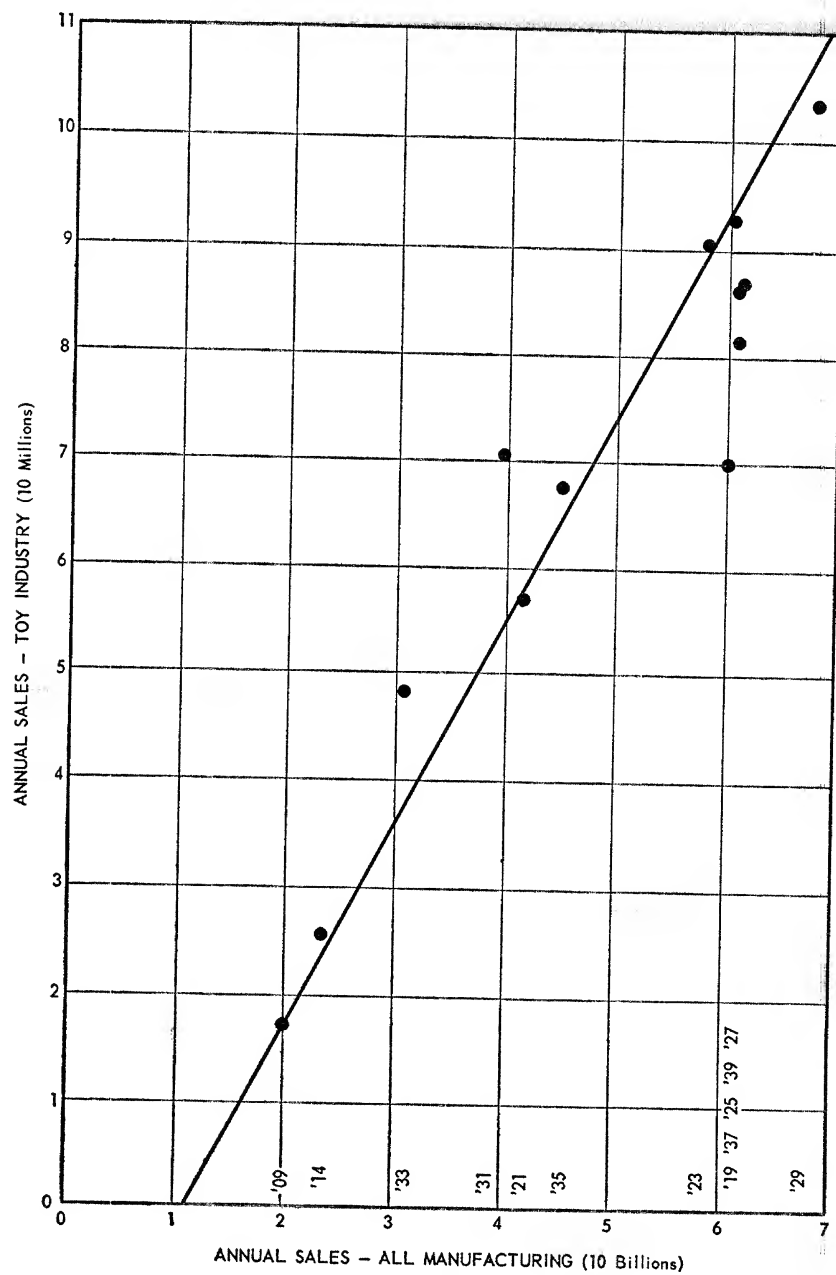


Figure 9. Annual Sales: Toy Industry - All Manufacturing

y = annual sales of the toy industry (in millions of dollars)  
 x = annual sales of all manufactures (in billions of dollars)

Only one of the years from 1909 to 1939, the year 1919, is distinctly out of trend.

For the year 1947, the sales of all manufactures were \$188,057,000,000. The trend indicates that toy sales for that year should be

$$\begin{aligned} y_{47} &= 1.9 \cdot 188 - 20 \\ &= 337.2 \text{ million dollars} \end{aligned}$$

The sales of toys in that year amounted to 337.5 million dollars.

Already at the time this book is being written, a few known facts (essentially the well-known increase in birth rate) indicate a probable continuation of a favorable growth trend for the toy industry.

Each toy manufacturer, moreover, is not only interested in the growth of the industry as a whole but more specifically in the growth of the market for each of the types of toys he manufactures. This is why the above study must be completed by a description of the growth of the market for each age bracket.

Table IV and Figure 10 based on actual data until 1949 and on Census forecasts for the years 1929-1955 indicate the number of children by age groups. They can be used by a manufacturer as an aid to evaluating the future growth factor of the market of his different toys and games.

The following example given in the previously quoted study [Moore, 1949] by the Department of Commerce illustrates:

The manufacturer of toys for children under five years of age will note that his potential users in 1948 numbered 50 percent more than in 1940 but he should also note the anticipated decline after 1951. On the other hand, the manufacturer of toys suited to 6 and 7 years old can expect to benefit from the anticipated increase after 1951 in that age group.

Such remarks refer only to the industry growth factor. The final forecast for a business will, of course, take into account all the other factors that should be considered (specific ones related to the business, general economic forces).

- b. *Measurement of the growth of a given business*
- b. *in relation to the growth of an industry*

This problem may be illustrated by the use of the data of the American Tobacco Company's annual sales and the annual consumption of

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TABLE IV

--NUMBER OF CHILDREN BY AGE GROUPS, 1929-55

[In thousands]

Year (as of July 1)	Under 5 years	5-9 years	10-14 years	Total under 15 years	Year (as of July 1)	Under 5 years	5-9 years	10-14 years	Total under 15 years
1929.....	11,735	12,586	11,884	36,205	1943 <sup>2</sup> .....	12,967	10,896	10,368	34,851
1930 <sup>1</sup> .....	11,444	12,608	12,005	36,057	1944 <sup>2</sup> .....	13,506	11,167	10,747	35,420
1931.....	11,179	12,469	12,160	35,808	1945 <sup>2</sup> .....	13,997	11,348	10,650	35,995
1932.....	10,903	12,319	12,295	35,517	1946 <sup>2</sup> .....	14,284	11,633	10,620	36,537
1933.....	10,612	12,176	12,355	35,143	1947 <sup>2</sup> .....	15,467	12,110	10,667	38,244
1934.....	10,331	11,981	12,421	34,733	1948 <sup>2</sup> .....	15,989	12,893	10,880	39,742
1935.....	10,170	11,789	12,424	34,383	1949 <sup>2</sup> <sup>3</sup> .....	16,263	13,417	11,136	40,816
1936.....	10,044	11,594	12,348	33,986	1950 <sup>2</sup> <sup>3</sup> .....	16,446	13,903	11,309	41,658
1937.....	10,009	11,335	12,229	33,573	1951 <sup>2</sup> <sup>3</sup> .....	16,507	14,177	11,591	42,275
1938.....	10,176	11,056	12,090	33,322	1952 <sup>2</sup> <sup>3</sup> .....	15,319	15,339	12,061	42,719
1939.....	10,418	10,795	11,906	33,119	1953 <sup>2</sup> <sup>3</sup> .....	14,303	15,777	12,831	42,911
1940 <sup>1</sup> <sup>2</sup> .....	11,404	10,685	11,746	33,835	1954 <sup>2</sup> <sup>3</sup> .....	13,434	16,136	13,371	42,941
1941 <sup>2</sup> .....	11,725	10,647	11,499	33,871	1955 <sup>2</sup> <sup>3</sup> .....	12,698	16,323	13,855	42,876
1942 <sup>2</sup> .....	12,194	10,691	11,258	34,143					

<sup>1</sup> 1930 and 1940 are as of April 1; all other years are as of July 1.<sup>2</sup> 1940-55 are adjusted for Census underenumeration of children under 5 years of age; 1929-39 are not adjusted.<sup>3</sup> 1949-55 are forecasts by Bureau of Census based on current estimates for July 1, 1947, and with no allowance for subsequent immigration. (For more detailed description of basis used refer to Bureau of Census Current Population Reports, Series P-25, No. 18.)

Source: Bureau of Census.

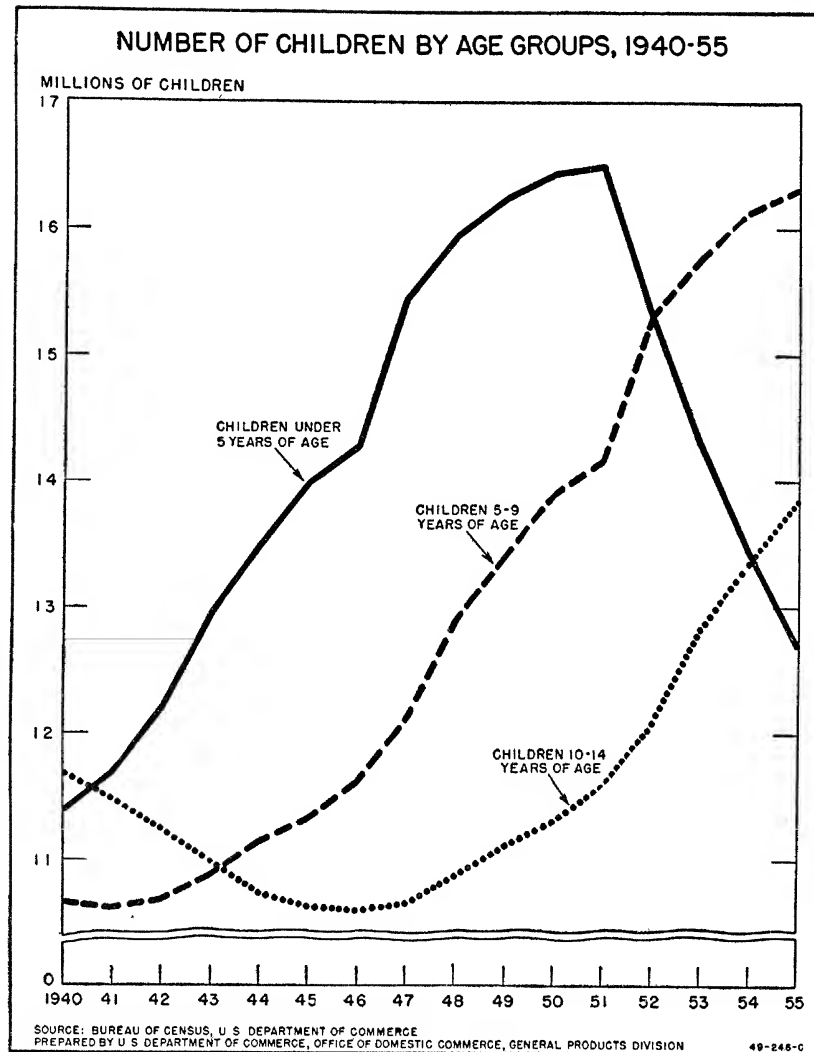


Figure 10. Number of Children by Age Groups, 1940-1955

tobacco and smoking supplies in the U.S.A. as reported in the Survey of Current Business of the Department of Commerce. These data are as in Tables V and VI.

From these data, the actual sales of the American Tobacco Company may be plotted by years, while the annual consumption of tobacco and smoking supplies relative to American Tobacco sales from 1934 as a

TABLE V  
ANNUAL SALES  
of  
AMERICAN TOBACCO COMPANY  
(Millions of Dollars)

1934	222	1941	336
1935	220	1942	422
1936	232	1943	529
1937	242	1944	533
1938	253	1945	557
1939	262	1946	764
1940	285	1947	819

TABLE VI  
CONSUMPTION EXPENDITURES FOR TOBACCO  
PRODUCTS AND SMOKING SUPPLIES  
(Millions of Dollars)

1934	1,370	1941	2,073
1935	1,438	1942	2,300
1936	1,540	1943	2,509
1937	1,679	1944	2,509
1938	1,703	1945	2,869
1939	1,773	1946	3,411
1940	1,875	1947	3,880

*common base* (\$222,000,000) may be computed. When both these sets of data are plotted as shown in Figure 11 and connected by lines between each pair of adjacent points and a *trend line* is then drawn (by inspection) through each set of points, the following conditions are revealed:

1. The American Tobacco Company, for the 14 years under review, has experienced a regular and consistent growth, typical in form to what has been experienced in many businesses and frequently referred to as a "normal" growth curve.
2. The curve of total annual consumption also follows a well-defined trend which is similar in form to that part of the growth curve before the inflection point or place where it begins to bend over, as seems to be the case for the American Tobacco Company somewhere between the years 1943-1946.

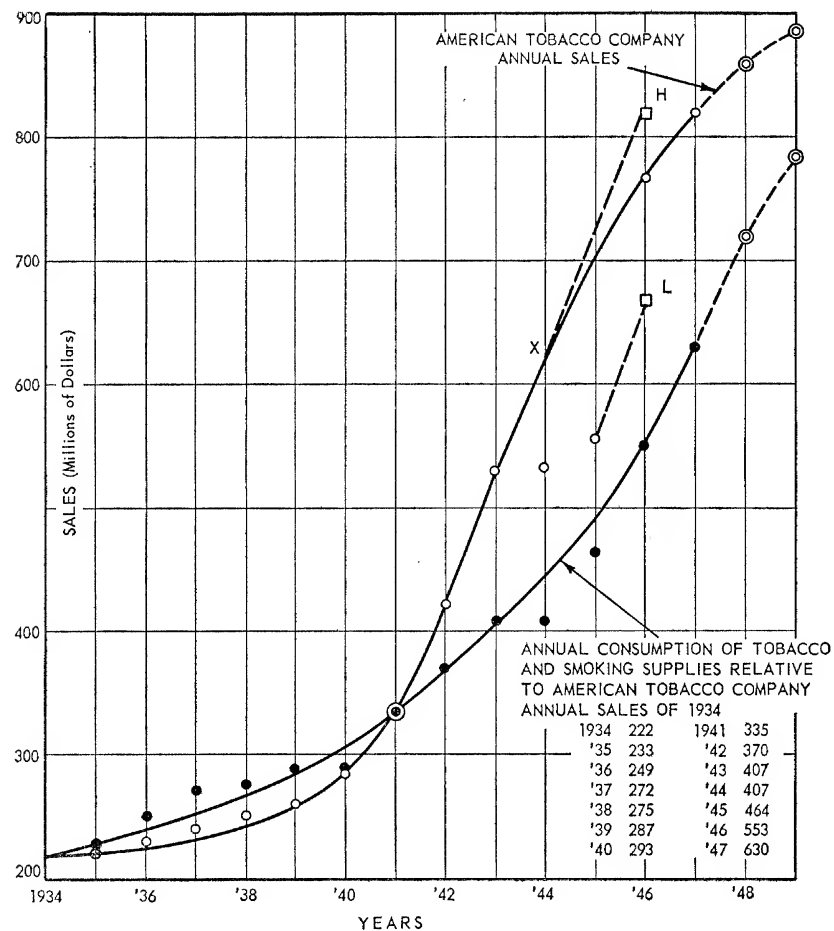


Figure 11. American Tobacco Co. Annual Sales compared to Index of Annual Consumption of Tobacco and Smoking Supplies

3. Both trends were diverted from their course in the years 1944 and 1945.

What now can be inferred from these curves? How may they be used as measures of next year's sales? In the first place, it should be noted that the trend lines in each case are drawn after 14 years of experience and that they begin to assume definite form about 1942-1943 or after 9 or 10 years. If the sales manager were forecasting in 1943 what the sales in 1944 could be, he might extrapolate the growth curve (from

the 1942-1943 trend on the basis of monthly sales) and arrive at an estimate of \$620,000,000 sales for 1944, as shown at X in the chart. As the history of sales in this case illustrates, an estimate of this character, based on the assumption that the company's future sales will follow a *previous* trend, implies that the total economic environment will be unchanged. In fact, the economic climate cannot be disregarded. Here is where the economist is needed. If this forecast were referred to him he would be able to point out those factors in the total economy (war-time regulations and restrictions in 1944, for example) which would affect this estimate. How he may proceed to make his measurements will be considered later. After the regulations and restrictions are removed in 1945 the sales of the company in 1946 and 1947 were found to fall in the continuation of the growth curve established in the years 1934-1943.

If the restrictions which deflected the curve were removed by 1946, and if the sales manager had extrapolated the trend of the years 1941-1943 on the assumption that company sales would now assume a position on this trend, he would estimate sales for 1946 at about \$820,000,000, as shown at H in Figure 11. But in view of the poor showing in 1945 he might have established his estimate to L by applying the 1941-1942-1943 rate *from the year 1945*. He then could have assumed that the sales of 1946 would be somewhere between H and L. If, in 1946, he noted that current *rates* of sales (weekly or monthly) of the whole industry were substantially greater than in the previous year, he might have given more weight to the upper limit H than to the lower limit L, and arrived somewhere near the actual sales made in 1946. This description of a procedure for forecasting next year's sales which could have been followed by the sales manager of a company having annual sales and a sales trend as shown in Figure 11 illustrates an acceptable method of measurement for forecasting the sales of products, such as tobacco, which are standard, bought by a large number of customers in which the adjustment factors and specific sales factors are relatively of little importance. The controlling factors in sales in the above case are the growth factors, the general economic factors, and the administrative factors (essentially advertising).

After the sales manager has estimated the sales for the year 1946, as suggested above, let us assume that the economist is asked to submit *his* views. He will measure the probable future sales from the standpoint of the annual personal disposable income, since he has found through his research that the company's sales are closely related to this factor in the total economy. His evidence on this point is shown

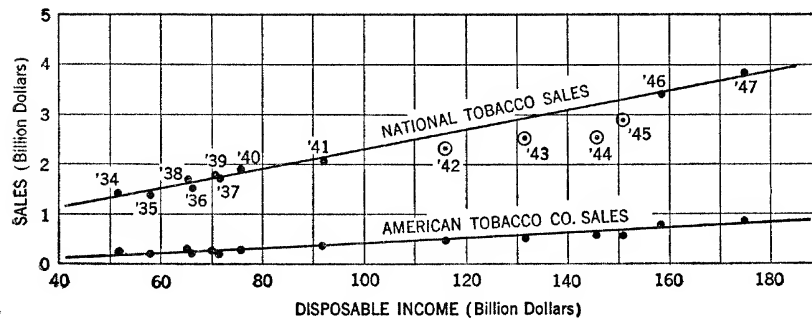


Figure 12. American Tobacco Co. Sales and National Tobacco Sales vs. Disposable Income

in Figure 12 which shows that the company's sales are very closely correlated to disposable income. If he had tabulated the periodic reports on the annual *rate* of disposable income, regularly published by the Department of Commerce, he would have found that that rate indicated a probable disposable income for 1946 of 158 billion dollars. Either by calculation or by the use of a chart similar to Figure 12 he would then estimate that the probable annual sales of the company for 1946 would be about \$775,000,000. This then would tend to support the sales manager's conclusion that the sales would be above the mid-point between H and L.

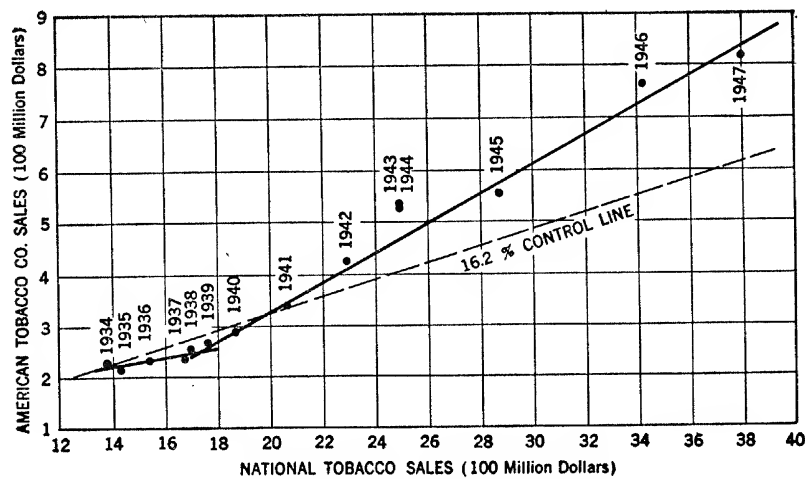


Figure 13. American Tobacco Co. Sales vs. National Tobacco Sales

If the economist had also prepared an analysis of the trend of American Tobacco Company sales to national tobacco sales such as shown in Figure 12, he would have checked the probable position of the company in the total market by noting the annual rate of national tobacco sales as reported by the Department of Commerce or the trade association and estimated that national tobacco sales in 1946 would probably be about 3.43 billion dollars. On this basis he would conclude that the company's sales would be about \$740,000,000. On the bases of these estimates the sales manager might readily conclude that the annual sales of the company would be somewhere between

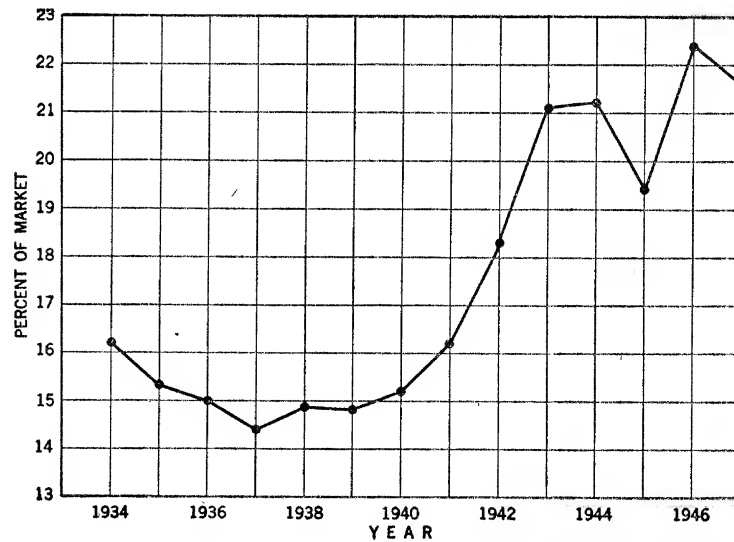


Figure 14. American Tobacco Co. Sales as Percent of National Tobacco Sales

\$740,000,000 to \$775,000,000 and select the midpoint between these values or about \$760,000,000. The actual sales as noted in Table V were \$764,000,000.

How would the economist proceed in 1946 to advise on probable sales in 1947? Would he apply the results of other observations? As an observant researcher he would probably observe from Figure 13 that the trend in American Tobacco sales to national sales was departed from in 1943, 1944, 1945, and 1946. That is, he would observe the scatter of annual sales points about the trend line and decide to chart the company's varying share of the national market as shown in Figure 14. From this he would note that the steadily rising upward trend from

1939 to 1943 was broken in 1944, declined in 1945, and rose sharply in 1946. This would indicate to him that the trend of increase in the company's percent of the market since 1943 was tending to rise at a lesser rate than formerly, that the scatter about this trend was quite marked and, noting the position of 1943-1944 and 1945 about the new trend, that it would not be unlikely that 1947 would be below the new percent trend and hence probably below the trend in sales noted in Figure 13. With these facts before him he would therefore estimate the company's sales for 1947 on the bases of National Tobacco sales to be below the trend of Figure 13. The results show that this precaution was well taken.

The foregoing exposition of the method of determining and measuring the effect of the current growth factors on future sales, was written after the facts were in. Nevertheless it represents a valid technique for procedure in measurement and illustrates the importance of cooperation in such procedure by the economist with the sales manager. This exposition, however, does not imply that the details of analysis used in this case are the only ones to be used in all cases. In the first place, the growth curves of sales of some businesses are not so simple, and further techniques are called for in interpreting them. In the next case the economist does not always find that disposable income furnishes an adequate or sufficient reference trend. This, as shown subsequently, is not the case in businesses associated with the heavy-goods industries or with contract construction.

To illustrate, let us take another case, a business manufacturing a product used mainly by the consumer-goods industries. This product is dealt with for forecasting purposes in terms of physical units, as is often necessary for purposes of scheduling production in relation to sales and inventory budgets (considered in Chapter VI).

The record of annual sales of this product is as shown in Table VII. The data are actual figures. The authors are not at liberty to disclose the name of the company nor to identify the product.

When the annual sales are plotted by years the result is as shown in Figure 15. An analysis of these plotted data shows that in their record of 31 years, while the whole trend might be considered as following, with considerable scatter, the general form of a "normal" growth curve such as  $T_1 - T_2$ , the successive annual sales beginning with 1921 follow five distinct straight-line trends. From 1921 to 1929, a period of 10 years, the trend A — B is followed. From 1929 to 1932 (a period of 4 years) sales follow the downward trend C — D. An upward trend E — F is followed for the 4-year period 1934-1937 while the year 1938

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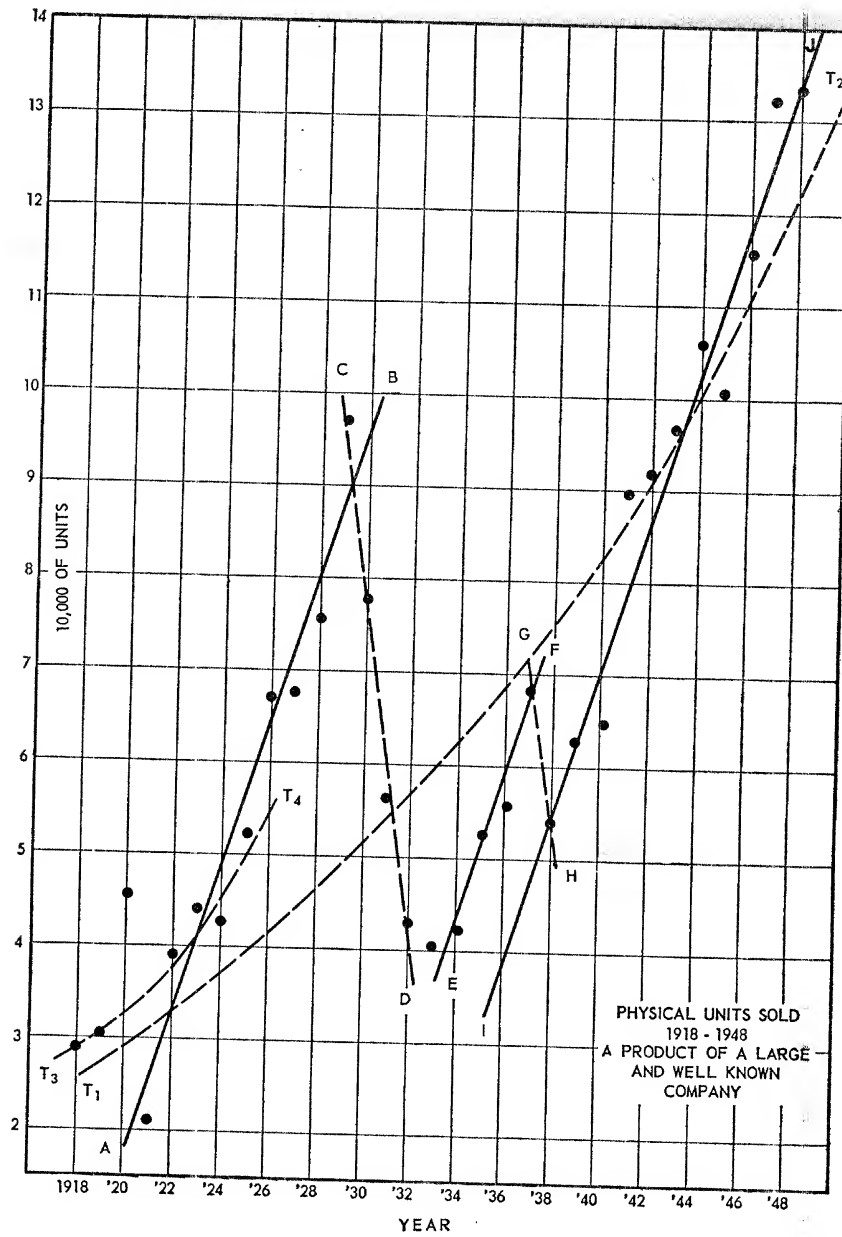


Figure 15. Graph of Annual Sales of the Product of a Well-Known Company

TABLE VII  
ANNUAL SALES IN PHYSICAL UNITS  
OF A GIVEN PRODUCT

<i>Year</i>	<i>Physical Units Sold</i>	<i>Year</i>	<i>Physical Units Sold</i>
1918	29,149	1933	40,540
1919	30,452	1934	42,900
1920	45,428	1935	52,568
1921	21,085	1936	55,989
1922	39,152	1937	68,334
1923	43,992	1938	54,199
1924	42,525	1939	63,170
1925	52,042	1940	64,509
1926	67,151	1941	89,779
1927	67,662	1942	91,793
1928	75,647	1943	96,785
1929	97,009	1944	106,266
1930	78,268	1945	100,558
1931	56,581	1946	115,783
1932	42,872	1947	132,927
		1948	134,287

showed a drop along the trend G — H. From 1938-1948 (a period of 11 years) there is an upward trend along the line I — J. Curiously enough, the three upward-trend lines are parallel to one another and the two downward trends are also parallel to each other. The trends can only be discovered after all the facts are known. Unless there is a known good reason for these coincidences, it is extremely dangerous to count on these conditions being closely conformed to in latter years.

How might the sales manager use these data of "current" growth in forecasting next year's sales? Let us assume that it is the early twenties and the data are being compiled. In the first place there must be evidence of trend before the data may be used for forecasting by extrapolating the trend line. Accordingly, if such data were plotted up to 1925 and the high of 1920 were averaged with the low of 1921, a "normal" growth curve (easily discerned as the trend  $T_3 - T_4$ ) could be assumed to be in the making.

If the sales manager should assume in 1925 that on the basis of this trend the 1926 sales should be about 55,000 units, it would appear as a reasonable assumption from the trend of the data. But events would prove that this would have been too short of the mark. The sales realized were about 67,000 or more than 20 percent above that forecast. If on the other hand the sales manager had referred the matter

to the economist, he would have been informed that the national economy was experiencing a decided upswing and from *his* data he would conclude that the sales manager's estimate should be increased by a significant amount, say 15 percent. If the sales manager would then have revised his estimate upward he might have forecast sales for 1926 at about 65,000 units. After 1926, what would have been the procedure for forecasting the sales for 1927? In the first place the sales manager, being guided by the economist's analysis of general economic conditions and the experience of 1926, together with the evidence of current weekly orders, might conclude that the trend  $T_3 - T_4$  was no longer valid and that sales would probably lie somewhere along the line  $A - B$  (for the years 1921 to 1926). On this basis 1927 sales should be about 72,000 units. But it might well have been that an important account of 1926 was not renewed in 1927 and therefore a downward adjustment of the 72,000 units forecast would have to be made. If this account would call for a downward adjustment of 3,000 units, the sales forecast for 1927 would be 69,000 units. The actual sales in 1927 were over 67,000 units.

The above description of year-by-year forecasting from 1926 to 1929 might well have taken place in the above case if the methods and techniques of budgeting now known had been available at that time. But sales managers of that day did not as a rule follow the procedures described above, nor were there economists generally available to them for guidance as to the trends in general economic conditions. For these reasons very few companies were prepared for the declines in sales during 1930, 1931, and 1932.

With the upward turn of sales in 1934 and the decided expansion in sales in 1935, some companies became more alert to general economic conditions and their effect on sales. In 1937 the conditions which brought the decline in 1938 were foreseen by many economists and made known to the businessman. The war years and the postwar years period resulted in a sales trend from 1938 to 1948 along the line  $I - J$ . But in 1939 there was no evidence of such a trend. The sales manager had sales records only up to and including 1938. How would he proceed to forecast the sales for 1939? If he plotted the data for the sales from 1933 to 1938, he would not be able to distinguish a clear trend. If he consulted the economist for guidance, he might have learned some new facts about the problem of sales forecasting. The economist, searching for a trend comparator in the general economy and knowing that the physical units the company sold were used in the non-durable goods industry, might make a comparison of the yearly non-durable goods

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expenditures<sup>1</sup> in the total economy, with the physical units<sup>2</sup> sold by the company. Such a comparison might be made as shown in Figure 16, in which both the yearly sales of physical units and the dollars expenditures for non-durable goods in the total economy are expressed as relatives in which 1929 = 100 in each case.

This shows a striking similarity in form between the two phenomena. The economist would then probably test this relationship by plotting annual sales of physical units by the company against dollars of non-durable goods sold in the nation as shown in Figure 17. He would then

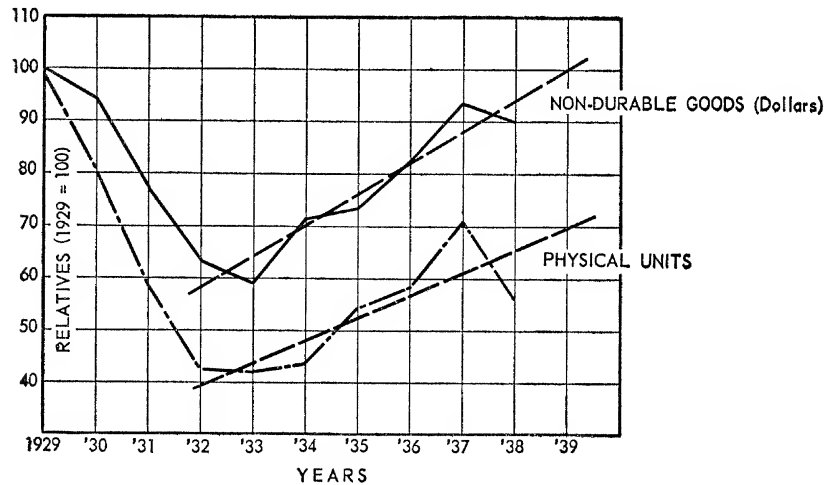


Figure 16. Comparison of Relatives of Annual Sales of Non-Durable Goods and Physical Units Sold by a Well-Known Company  
Annual Sales

discover the downward trend line of 1929-1933 and the upward trend line of 1933 to 1938. It is the trend line of 1933-1938 which is to be used with reference to forecasting 1938. But before the economist goes too far with this assumption he may test if the break in 1933 represents the beginning of a series of declining annual sales as occurred in 1930. This he finds is not the case and all indicators in the national economy point to a general upward trend. How then may the trends shown in Figures 16 and 17 be used to guide the forecaster of the 1939 sales?

<sup>1</sup> Such as published by the Survey of Current Business of the U. S. Dept. of Commerce, see for example July, 1948, page 16.

<sup>2</sup> He might later refine this comparison if the physical quantities sold could be expressed in dollars throughout the years.

In Figure 16 it appears that the trend line for non-durable goods passes through the relative 100 in 1939 and the trend line of physical units passes through the relative 70 in 1939. The relationship of 100 for non-durable goods to 70 for physical units checks with the trend line of 1933-1938 of Figure 17 (Abscissa 100 and ordinate 70). But it is observed from Figure 16 that there is such a scatter of the points about the trend line as to suggest that when the non-durable relative is 100, for example, the relative of physical units may be somewhere in a range from a lower limit of about 65 to an upper limit of about 75, or about 7 percent either side of the mean.

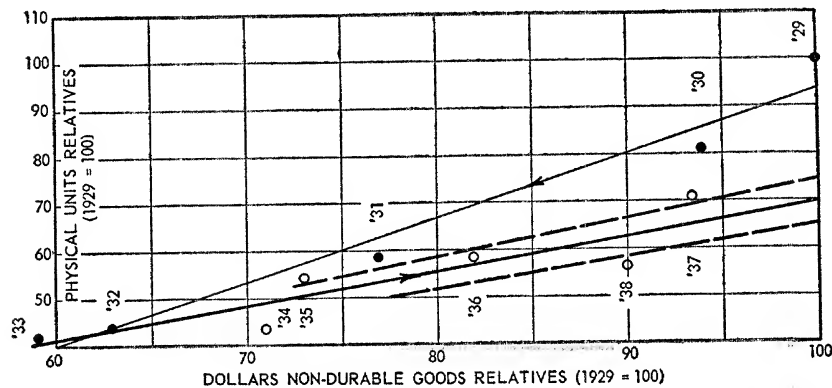


Figure 17. A Physical Units Annual Sales Relatives vs. Annual Dollar Sales of Non-Durable Goods

The next matter to inquire into is the probable value of the non-durable goods relative for 1939. Figure 16 shows that the scatter of points about the non-durable goods trend is about 4 percent either side of the mean, which means that the relative may be from 96 to 104 in 1939. Within these boundaries the sales manager and the economist would exercise their judgments. If they should estimate conservatively they might select the lower relative for non-durable goods (94) and the general trend line of Figure 16 and arrive at a relative of 66 for the physical units. Since this is 66 percent of 1929 sales it would mean  $0.66 \cdot 97,000 \text{ units} = 64,000 \text{ units}$  forecast for 1939 sales. The actual sales were 63,170 units.

The reader is again reminded that this is written *after the fact* and is subject to all the bias that a knowledge of such facts imposes. It does show, however, what might have taken place in the forecasting pro-

cedure. The reader may estimate for himself what the 1939 forecast would have been had either a more optimistic or a pessimistic view been taken in this situation in which a trend in Figure 16 was not clearly revealed. Let us now take the case that the war has closed, that the record of sales is completed up to and including 1945, and the sales manager is forecasting the sales for 1947. If he should observe that there are the trends A — B and E — F among the data as plotted in Figure 15, and that suggests to him to test the data of 1938 to 1946 for similarity in trend, he may define the trend I — J. This would suggest to him that 1947 sales should be forecast at about 125,000 units as a reference point. If this should be referred to the economist for an opinion he might test the relationship from 1938 to 1946 between the national sales of non-durable goods and the physical units sold by the company. The data are given in Table VIII.

TABLE VIII  
SALES OF NON-DURABLE GOODS  
AND  
SALES OF A GIVEN PRODUCT

<i>Year</i>	<i>Physical Units</i>	<i>National Expenditure Non-Durable Goods (Millions of dollars)</i>
1938	54,199	34,032
1939	63,170	35,258
1940	64,509	37,594
1941	89,779	43,960
1942	91,793	52,962
1943	96,785	61,205
1944	106,266	67,473
1945	100,558	75,367
1946	115,793	87,478

Upon plotting these data as shown in Figure 18, it would be found that in the first 3 years under review (1938, 1939, 1940) the physical units bore a wholly different relation to dollars of non-durable goods sold, than occurred for the years from 1941 to 1946. This illustrates the importance of continuously checking the trend of the comparator used so that departures of the above nature may be discovered. It also shows the need for cooperation between the sales manager who knows the current market conditions and the economist whose business is to study such relations as the above. From Figure 18 the sales manager learns

the current trend of relations between the comparator and company sales.

If the economist watching the current trend in the sale of non-durable goods should inform the sales manager that it appears likely that non-durable goods sales for 1947 will be about 97 billion dollars, the sales manager could find from Figure 18 that the physical units should be forecast on the basis of 120,000. But from his knowledge of the market he may estimate that new accounts taken on and increasing orders from regular accounts and an unusual backlog of orders call for an increase of 10 percent above the trend. In that event his final sales

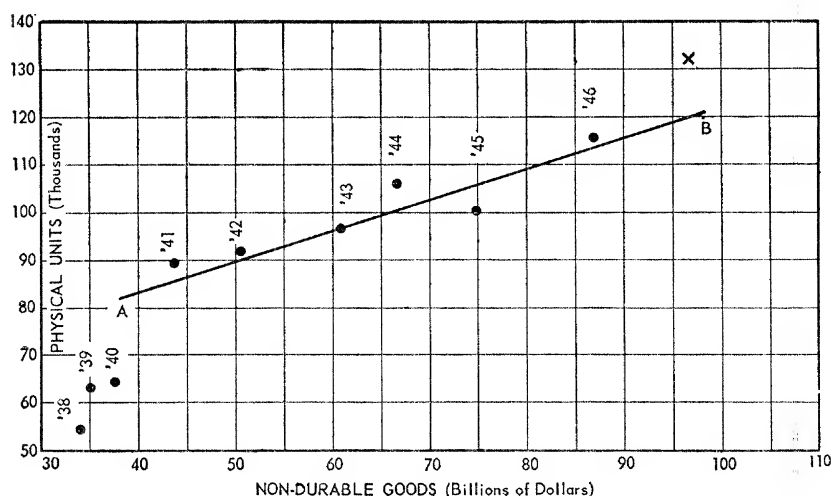


Figure 18. Annual Sales of Physical Units vs. Dollar Sales of Non-Durable Goods

forecast would be 132,000 units for 1947. The actual sales for 1947 were 132,927 units as shown at X in Figure 18.

The above descriptions of procedure in forecasting sales for selected years during the period from 1918 to 1948 are given to illustrate how the data available to the sales manager and to the economist should be used jointly. They also illustrate the importance of adjusting such data to the facts of a given company's market, as when the sales manager applies his special knowledge in the last example given. In setting up these examples, this special knowledge on the part of the sales manager was assumed to be fairly accurate.

The accuracy of any sales forecast then depends on:

1. The assembly and interpretation of known data to establish a rational base.
2. The judgment of the sales manager from his knowledge of the company's movements in the market, as to the appropriate variation from the base.

### PROCEDURE IN MAKING THE FINAL SALES BUDGET

#### I. PREPARATION FOR SUBMISSION TO ADMINISTRATION

Since the preparation of the sales budget is a joint enterprise requiring the participation of all those who have an intimate knowledge of the details of the market and of those who understand the trends in business conditions as affected by the general economic forces and the administration with its broad contacts and influences, a systematic procedure must be provided for integrating all these classes of information. While the steps to be taken will vary with each business, the following general pattern of procedure is found in most companies in which sales budgeting is successfully accomplished.

a. *Request for information as to data and opinions  
on specific sales factors*

The officer of the company in charge of assembling such data and opinions, frequently the controller, prepares appropriate forms on which the above matters are to be recorded. The forms should be prepared at that date which experience proves is adequate for issuance of the final budget. These forms are then passed on with letters of request to the general sales manager, to sales department heads and from them on down the lines of authority to the men in the field. Starting with "grassroots" data and opinions, these forms then proceed up the line, are amplified with further data and opinions at each assembly point, and are finally returned to the appropriate heads of the several sales divisions and then to the general sales manager.

b. *Formulating such data and opinions and determining  
the influence of general economic forces*

The general sales manager with the data and opinions on the market and with information from the manufacturing division as to product and production changes and his own decisions on marketing changes and as to growth trends, proceeds to evaluate the (1) adjustment factors, (2) change factors, and (3) growth factors as described in the examples cited above. In cooperation with the economist he also applies

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to the above formulation the modifying factor which expresses the effect of general economic conditions. A tentative budget proposal is now available for administrative review and authorization.

## II ADMINISTRATIVE ACTION

The administrative officers, when properly advised, usually have before them a compendium of opinions from a variety of recognized authoritative sources as to the general trend in business affairs. These authorities do not agree, but a compilation of the opinions expressed by them will be found to fall within specific limits and to have a general average. Upon this basis, modified by its own judgment, and after taking due account of administrative decision such as advertising and pricing policies, the administration will either accept the proposal as presented or adjust it percentagewise upward or downward.

### *The Budget Equation*

By this pattern of successive steps the present annual sales  $S_p$  is translated into the budget sales ( $S$ ) each factor is evaluated and the final budget equation is, as previously determined (p. 69)

$$S = [S_p + (\pm a \pm c \pm g)] \cdot E \cdot A$$

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# PART II

## INVENTORY, PRODUCTION, AND EXPENSE BUDGETS

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## ■.VI

### INVENTORY AND PRODUCTION

**T**O STABILIZE production and yet to adjust it so as to maintain the inventory at its optimum level is one of the cornerstones of budgetary control. An attempt will be made in this chapter to present the general principles by which this cardinal problem of industrial management can be solved.

It was estimated [F.T.C., S.F.C., 1949] that at the end of 1948, the inventory of United States manufacturing corporations was almost three times as big as their cash (\$29,722,000,000 against \$10,969,000,000). Such a figure illustrates the fact that, on the average, inventory represents a much greater investment than cash, even though it is traditionally listed second on the balance sheet.

At the same time, inventory is a dangerous asset. It may suddenly become valueless through no direct fault of its owners. A change in the specific market conditions or in the general economic situation may rapidly transform an active inventory into a slow-moving and thereafter into an obsolete one that may have to be written off. Even under

favorable circumstances, the keeping of inventory is the origin of substantial expenses such as warehousing and insurance expense and it always requires the investment of a substantial part of the working capital.

All these factors emphasize the expense, the risk, and the difficulty involved in keeping a large inventory.

Yet, to maintain the inventory at too low a level may also be expensive, risky, and the source of many difficulties.

In modern manufacturing, it is always expensive and sometimes, because of set-up costs, economically impossible to produce goods in small lots. It will often be advisable to produce a large lot, in anticipation of future orders, if one wants to be able to sell the product at a price that can be paid by those customers who place orders of average size. [For the determination of economic lot size, *Eco. Ind. Mgmt.*, 296, et seq.]

It is also a fact that sales are sometimes lost through cancellations if the producer is not able to deliver the goods at the time the customer needs them. The unavoidable delays in obtaining the raw material, in producing, transporting, and delivering the goods are therefore another reason for maintaining inventory at a certain level.

Last but not the least consideration in favor of maintaining an inventory of a given size is the need for stabilizing production. Ups and downs in sales are unavoidable. Ups and downs in production can be avoided by the skilful use of the inventory's reservoir effect. Unless such a use of inventory is carefully planned it may, however, lead to an excessive and very dangerous accumulation of goods. This is why effective stabilization of production must in most cases be associated with sales forecast and budgetary control of which it is, in final analysis, the best reward.

Stabilization of production is the source of many advantages and the numerous businesses that have lately introduced budgetary control and obtained, as a result, a stabilization of production never reached before, have experienced remarkable reductions in costs and improvement in the general operation of the business.

According to its controller, Mr. Edmond S. La Rose, the Bausch and Lomb Optical Company, as a result of the introduction of budgetary control, reduced the yearly labor fluctuation, above and below the average monthly number of employees, from 33.5 percent above average and 10 percent below average number in 1924 to 4.3 percent above and 4.2 percent below in 1930. In the years after 1930, the pattern has remained about the same or rather has become even more

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satisfactory from the point of view of stability of employment. [Appendix C]

More secure jobs attract a better working force and improve the morale generally; stabilization of employment reduces the expense of training new workers; raw material can be purchased more economically and delivery of finished goods can be arranged more effectively; manufacturing lots can be of the most economical size, etc.

Stabilization of production implies inventory control, indeed, so as to keep within safe limits the size of the reservoir thus utilized to compensate for ups and downs in sales. Yet, ups and down in production that would be their logical consequence are avoided by the use of inventory as a sort of flywheel to operations, storing and expanding salable goods to keep the rate of production within narrow limits at several but few successive levels.

The builders of the Panama Canal faced the problem of bringing their waterway as high as 85 feet. It would not have been possible to design a canal with an up-and-down slope. Instead 12 locks (in pairs) were built, creating a succession of horizontal water levels.

So can a succession of stabilized production levels based on a reliable sales forecast be substituted in a budgeted business for the expensive peaks and hollows that are found in a non-budgeted one.

For many years the manufacturer of a well-known brand of refrigerators suffered greatly from seasonal variations. Production was increased in the spring to fill the seasonal summer demand, workers had to be trained at their jobs, additional supervision was needed, and overtime was expensive. The introduction of budgetary control based on sales forecasting changed the whole pattern of operations. Production was stabilized at an almost horizontal level throughout the year, with slight variations accounting for vacations, inventory taking, maintenance, etc. The graph in Figure 19 illustrates this (data are for the purpose of illustration only). On this graph actual and budgeted sales followed the same trend which is marked SALES. This will not always be the case. The methods to be followed to adjust production when actual sales depart from budgeted sales will be discussed later on. (See page 193 et seq.) It will be sufficient at this point to state that, even so, production will not proceed by disorderly ups and downs, following more or less closely the sales pattern, but will be adjusted to sales, from time to time, by scheduling the output at successive levels which remain constant over an appreciable period of time (weeks or months).

## INVENTORY BUDGET

## A COMPROMISE BETWEEN CONFLICTING FACTORS

The above considerations reveal a fundamental conflict underlying the problem of inventory in industry. An inventory may be too large and yet it may be too small. In either case, expenses, difficulties, and risks are involved. It is not an exaggeration to state that to determine the optimum size of inventory and to adjust and stabilize production

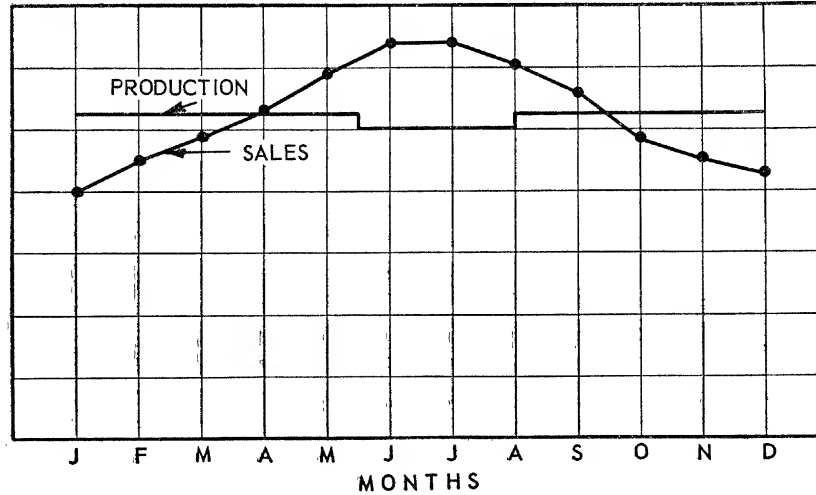


Figure 19. Comparison of Monthly Budgets of Sales with Approximately Uniform Monthly Production

accordingly is the key to success in modern manufacturing.

Obviously, such an optimum size is a compromise between the conflicting factors that have just been reviewed. How can the budgeter determine the desirable size of the inventory for each product or group of products?

#### 1. Minimum safety limit

An inventory fluctuates. The first step therefore is to determine the lowest permissible limit of inventory for each product or group of products. The limit may be zero. This will be the case, for instance, for all the goods manufactured on orders or for rapidly perishable goods.

As a rule, however, it may be said that a going business needs to



have always on hand a certain quantity of most items it produces. A drug manufacturer, for instance, would lose his good-will if he was not in a position to deliver immediately such staple articles as penicillin, aspirin, or thousands of other items of such current use.

The minimum safety level may be defined as that amount of inventory below which it is considered that the inventory should at no time be permitted to go in order not to interfere with the delivery of orders. This safety level is determined for each product by the sales manager, who takes into account the habits of the customers, the usual size of single orders, the possibility of sudden orders, the degree of urgency with which a product may be needed, etc. He will also, in cooperation with the production manager, take into account such factors as the minimum time required for production of a given item. Finally, he must also consider the time involved in transportation, warehousing, and delivery. If the demand for the product is highly seasonal, it may be desirable to determine more than one minimum safety limit throughout the year.

In any case, it should be clearly understood that the minimum safety limit is *not* the level at which the inventory can normally be kept. The more the production is stabilized at its most economical level (economic lot size) and the more diversified the production, the greater the chances that the inventory will have to be maintained at a substantially higher level. In a plant manufacturing hundreds or thousands of different items, the production is generally so scheduled that the same item will not be run more than a few times a year, so as to reduce the set-up cost to its minimum. To maintain the inventory of such an item above its minimum safety limit at all times between two runs, it will be necessary to maintain an average inventory substantially higher than the minimum safety limit.

To eliminate the risk of losing sales and even sometimes good-will by lack of inventory, an emergency procedure is generally provided. Production of a given item will be immediately ordered if the inventory of such an item should happen to reach or fall below the safety limit. Such emergency orders, however, have always a disruptive effect on orderly production scheduling. They are the source of unnecessary expense (excessive set-up cost, overtime, waste of material, etc.). They should be avoided. The way to avoid them is to budget production at such a level that the inventory, while fluctuating between a maximum and a minimum, will at all times be above the minimum safety limit. At the same time the inventory should be kept within reasonable upper

limits to prevent an excessive and dangerous accumulation of goods. How can its proper upper limit be determined by the budgeter?

2. *Inventory turnover. Inventory budget. Inventory increase or reduction*

An approach to the problem is provided by the well-known financial ratio of sales to inventory (inventory turnover) used for the interpretation of financial statements. Such a ratio provides a yardstick by which it is possible to measure the size of an inventory in relation to sales. It opens the way to the use of standards.

For example, during the year 1949 a given business sold 1,200,000 units of product A. During the same period 400,000 units of the product were, on the average, carried in inventory throughout the year. In such a case, the inventory turnover for product A was

$$\frac{1,200,000}{400,000} = 3.$$

The yearly inventory turnover is the ratio of annual sales to average annual inventory. It is also the number of times the inventory "turns over" during the year.

The larger the turnover, the smaller the amount of working capital necessary for a given volume of business and, all other things being equal, the larger the percentage of operating profit on the capital invested. Less inventory for a given volume means less insurance, less loss from spoilage, obsolescence or price decline, less interest charges, etc.

This is why the inventory turnover is currently used as one of the measures of the efficiency of operation in a business [*Eco. Ind. Mgmt.*, 62]. Due consideration being given to the conditions of operations and the kind of business, the greater the turnover the more efficient the management.

Inventory turnover as a measure of management efficiency is generally computed as the ratio of total annual sales to the average of the total inventory carried throughout the year. As such it can be used by the budgeter only in a few cases because of the difficulty generally encountered in computing a meaningful "average inventory." If the range of variation from the average were not substantial, the average could be used directly, but such is rarely the case.

In fact, to avoid unduly complicated computations it has been found advisable to use periodically the actual instead of the annual average inventory turnover figures and to compare them either once a year or

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at certain given times of the year to the predetermined standard turnover ratio as will now be explained.

a. *Standard inventory turnover.* The standard inventory turnover for budgeting purposes will be defined as the *desired ratio of annual sales to actual inventory* at a given time conveniently chosen. This time will generally be the end of the fiscal year although it may also be the end of a month or of a few significant months of the year. The time at which the actual ratio is computed should be so chosen that the ratio will be as meaningful as possible (for instance: beginning or end of the seasonal peak, of the seasonal production run, etc.). To compute the ratio at this time is somehow measuring the inventory on hand with the most appropriate yardstick, namely the current yearly sales. By comparing the actual ratio to a predetermined standard ratio it is possible to say whether inventory is excessive and should be reduced or is insufficient and should be increased.

How to determine the standard is one of the problems the budgeter will have to solve in each individual case. The turnover of a product is a very important matter and the figure given to management as the one to aim for cannot be lightly determined.

As a matter of fact, the determination of the standard turnover of each product—which is required for proper budgeting—is one more instance where budgetary control will be of value to management as an additional aid for cost saving. It provides the opportunity for a systematic checking of the turnover, product by product. It will more than once throw light on unduly slow-moving lines of production, which otherwise would probably have remained undetected.

Actual turnovers, or if possible their average over a period of years, should certainly be taken into consideration when determining the standard to be used for budgeting. They should not, however, be accepted as such without further examination. An estimate should be made of production requirements, shipping facility, marketing conditions, and of all the other factors that may influence the turnover. A comparison should be made among the various lines of products and substantial differences in the turnover should be accounted for or be corrected before standards are finally accepted. Periodical checking and revision of standards are indeed in order.

b. *Unit of measurement.* Before leaving the subject of determining the standard turnover, the reader's attention is called to a possible difficulty in choosing the proper unit with which to measure sales and inventory.

A product may be sold at various prices: wholesale, retail, export

price, net or at discount, F.O.B. or delivered, etc. Prices may even change during the year.<sup>1</sup>

The valuation of inventory may also create a problem. If no standard costs are used, the difficulty is obvious. Even with an accounting system based on standard cost, even if the standards are maintained throughout the year or adjustment made for their change, the question arises of the allocation of factory expense to each unit of production. These are well-known problems of accounting that cannot be discussed in this book. It will suffice to indicate that, every time the sales and inventory are measured in dollars instead of physical units, such problems arise and should be solved.

The easy solution of using data expressed in physical units will sometimes be adequate and should then be preferred. The use of dollar figures is usually necessary to obtain a general picture of the situation when there are many lines of products. The dollar figures are the only ones in such a case that can be grouped and combined without difficulty.

c. *Classification of inventory.* In budgetary control, the sales figure to use for computing the turnover ratio is always the net sales for one product (or for a group of products), but which components of the inventory figure to use (finished goods, work in process, raw materials) will vary according to the kind of business being budgeted. If the raw material used for one product can easily be individualized, it might be a good policy to use the total inventory figure concerning the product (its raw material, goods in process, and finished-goods inventory). Sometimes there will be no choice. In the bakery industry, where a loaf of bread is baked every day, nothing would be gained by considering the ratio of sales to finished-goods inventory.

In most cases, in the manufacturing industries, it will be found advisable to use only the aggregate figure of goods in process and finished goods as inventory and not include the raw materials inventory. The reasons are that:

1. The raw materials can rarely be identified as being used for the production of one product.
2. The accounting system will generally not provide a day-by-day figure for the finished goods as distinct from the goods in process, while it will generally provide their aggregate total.

<sup>1</sup> For this reason, some budgeters, instead of using the ratio "sales to inventory," prefer to use the ratio annual cost of sales to inventory value thereby eliminating the influence of selling price variations. (See Appendix C)

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As a rule, therefore, it may be said that the ratio of sales to inventory used for budgetary purposes will be understood to be the ratio:

*annual net sales of the product*  
to  
*goods in process + finished goods inventory,*  
for the same product at a given time

d. *Inventory budget—Inventory increase or reduction.* Sales fluctuate throughout the year. If production is to be stabilized, inventory must also fluctuate to absorb the ups and downs of sales. The purpose of inventory budgeting is to keep such inventory fluctuating under control between a safe minimum and a safe maximum.

The inventory budget for a given product (or group of products) should satisfy these three requirements:

1. To keep inventory constantly above the minimum safety limit.
2. To keep inventory within the maximum determined for certain times of the year, by the sales forecast and the standard inventory turnover ratio.
3. To stabilize production in accordance with management's directives.

At the time the budget is being prepared, in a going business, the budgeter never starts from zero. There is a given inventory on hand (actually known or estimated, if need be) and this inventory on hand must be taken into account if requirement (2) above is to be satisfied by the inventory budget.

The sales forecast for the coming year should be compared to the actual inventory on hand. If their ratio is not approximately equal to the standard inventory turnover, an adjustment is required. This will be accomplished by budgeting an increase (or reduction) of inventory. *This budgeted increase (or reduction) will actually take place in the following months by producing more (or less) products than needed to meet the sales requirements, as they are forecasted by the monthly sales budget.*

### PRODUCTION BUDGET

The production budget therefore will be established only after the inventory increase or reduction has been decided upon, on the basis of:

1. The sales forecast for next year.

2. The actual (or estimated) inventory on hand at the end of the current year.
3. The standard inventory turnover.

*The yearly production budget is not equal to sales forecast, nor to sales forecast less inventory on hand, but to sales forecasts plus (or minus) the increase (or reduction) of inventory required to bring the actual inventory to the level of the budgeted inventory.*

It thus appears that sales forecast, inventory budgeting, and production budgeting are three links of the same chain: none of the three can be considered without reference to the two others.

EXAMPLE. This can easily be illustrated by returning to the previously quoted example. The business sold 1,200,000 units of product A during the year 1949. The inventory turnover was 3 in 1949; let us take this average as the standard ratio. Let us say that, by the end of 1949, at the time the 1950 budget is being prepared, the business has an actual inventory of 425,000 units of product A (which is either known from the accounting records or estimated, should the budgeting procedure start before the end of the year). This actual inventory figure is only slightly above the average to be expected on the basis of the 1949 sales (1,200,000 units for a turnover of 3) and would be acceptable if the sales forecast for 1950 was equal to 1949 sales. Let us say, however, that the sales forecast for 1950 for product A is only 900,000 units.

Applying the standard turnover ratio, it is seen that the desirable level of inventory is:

$$\frac{900,000}{3} = 300,000 \text{ units}$$

The actual inventory being 425,000 units, a reduction of inventory is required that is equal to:

$$425,000 - 300,000 = 125,000 \text{ units}$$

Depending on circumstances and the kind of business considered, the budgeter may want to use more or less time to accomplish such a reduction. In any case, the need for such a reduction will influence the production budget.

The total production for the year should therefore be budgeted at:

$$900,000 - 125,000 = 775,000 \text{ units}$$

At the end of the year 1950, according to the budgeted figures, the sales will have been 900,000 units and the production 775,000 units,

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added to the Dec. 31, 1949 inventory of 425,000 units, leaving a balance of

$$(425,000 + 775,000) - 900,000 = 300,000 \text{ units}$$

This balance is precisely equal to the budgeted inventory, which was obtained by applying the standard turnover ratio to the sales forecast.

## INVENTORY AND PRODUCTION BUDGETS

### QUARTERLY, MONTHLY, OR WEEKLY

Up to this point, the data chosen as examples were all given on a yearly basis. It is now time to take the seasonal variations into consideration as to their effect on the inventory and production budgets.

#### 1. *General principles*

The sales budget in its final form is established quarter by quarter or month by month, sometimes even week by week. It does reflect the seasonal variations of the market.

The production budget may or may not be influenced by the seasonal factors, depending on circumstances and management's policy; but, in any case, its pattern will not be similar to that of the sales budget. The sales budget, to be realistic, has to follow all the ups and downs to be expected in the sales volume during the year. The production budget will stabilize production at the same level, at least during a substantial period of time, even if there is more than one level of production throughout the year. This fundamental difference in the pattern of a sales budget as compared to a production budget is illustrated by the examples given. (See page 117 et seq., Figure 20 et seq.)

The inventory budget fills the gap between the seasonally sensitive sales budget and the stabilized production budget. This is to say that the inventory budget pattern will reflect the seasonal variations with a sensitivity comparable to that of the sales budget, although acting as a sort of reciprocal.

To keep actual sales in accordance with the sales budget is the responsibility of the sales manager; to keep actual production in accordance with the production budget is the responsibility of the production departments. The failure of either of them to perform as they are expected to, will unduly widen or reduce the budgeted gap between sales and production—the inventory.

The driver does not need to watch both the right wheel and the left wheel to keep a car on a straight line. As long as actual inventory is in

keeping with budgeted inventory, management may rest assured that both production and sales are doing what they should. In fact, in a budgeted business, the control of actual inventory in relation to budgeted inventory becomes the key to the joint control of sales and production by management.

It should be clearly understood at this point that the production budget is never to be considered as an order to proceed with actual

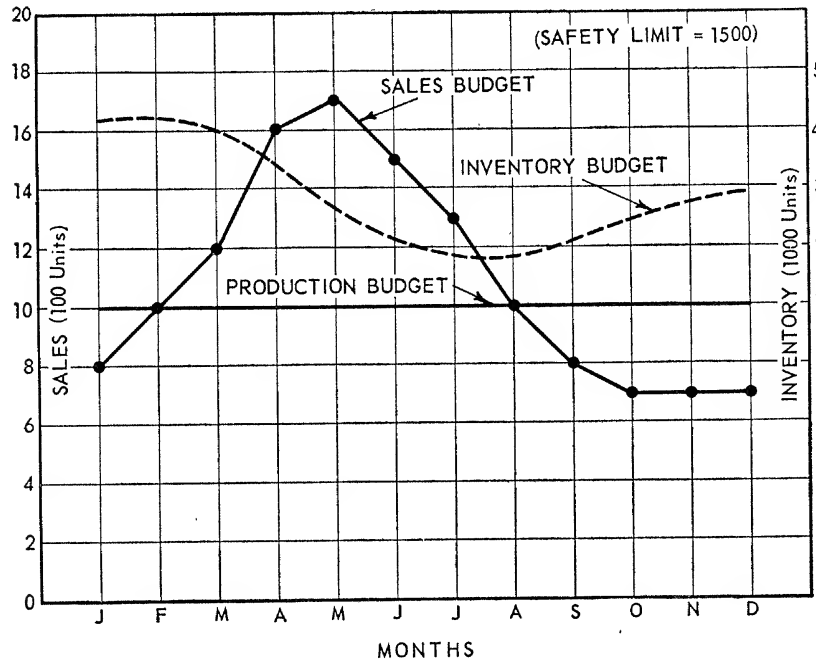


Figure 20. Comparison of Monthly Budgets of Sales and Inventory with Uniform Monthly Production

production. The proper authorities must always issue the required manufacturing orders, which in a budgeted business will be in accordance with the production budget.

In a uni-product business or in the case where only a few items are being produced, actual production scheduling is normally the direct application of the budget. The situation in a multi-product business, manufacturing a great number of items, is fundamentally different. The production budget in the latter case is merely a frame within which manufacturing orders for each individual item are issued by the



proper authorities (generally the sales department in cooperation with production-scheduling department).

The procedures by which actual production can be scheduled within the production budget should be organized in each individual case so as to be best adjusted to the business considered.

Although no general rule can be given, the authors have often found it convenient, in a multiproduct business, to have one executive in charge of *regulating* the production of specific items (which function is, strictly speaking, distinct from production scheduling). This executive cooperates closely with the order-received department, with production and purchasing. He periodically sends to production scheduling the manufacturing orders, i.e., a list of items to be produced, with an indication of quantity required (or authorized in addition to immediate requirements for the purpose of producing in economical conditions). A good method is to send this list each week for a four-week period, which implies a weekly revision of previous estimates in addition to new estimates for the latest week.

The primary duty of the production-regulating officer is to send to production scheduling manufacturing orders that can and should actually be scheduled for production. This means that such orders should essentially:

1. Be within the production budget.
2. Be in accordance with available production facilities and with the degree of flexibility attainable in the plant (conveyors, machines, trained labor, methods engineering, dispatching, etc.).
3. Satisfy the need for a well-balanced inventory, i.e., one that will permit the shipping of goods in the minimum of time after an order is received by the sales department, while keeping the total inventory within its budgetary limits and yet satisfying the exigencies of the customers whose orders, as a rule, specify the simultaneous shipment of several items.

The officer in charge of production regulating should therefore be able fully to understand the problems of selling, producing, purchasing, scheduling, and budgeting. In the multiproduct industry, whenever a great number of items is produced, his is a key position requiring exceptional ability and experience.

## 2. Examples

These examples will show the seasonal adjustments of sales, inventory, and production budgets. The yearly pattern is not involved. For

the sake of simplification, therefore, the same following yearly figures will be used in all cases (with some adjustments for Case 3):

Standard inventory turnover	4.33
Sales forecast (annual)	13,000 units
Inventory budget (at end of year)	3,000
Actual inventory at beginning of year	4,000
Budgeted reduction of inventory (annual)	1,000
Budgeted production (annual)	12,000

The differences between the following examples are based on differences in the conditions of sales and operations and in management policy.

CASE 1 In this case, the seasonal variations are such that the monthly sales are budgeted as in Table IX (Col. 1) and Figure 20.

It is first decided that the minimum safety limit is 1,500 units and that production should be stabilized at 1,000 units a month, if possible.

The resulting variations in inventory budget are shown in Figure 20 and in Table IX (Col. 3). It is seen that:

1. Production stabilization is being attained at the desired level.
2. The inventory is kept at all times above the minimum safety limit.
3. The inventory budget is such that the inventory will, at the end of the period, be equal to the desired size of 3,000 units (equal to the inventory on hand at the beginning of the year less the budgeted reduction:  $4,000 - 1,000 = 3,000$ )

The graph in Figure 20 shows that inventory will reach a minimum about August 31, at the point of intersection of the sales curve with the production level line.

Before August 31, sales were higher than production and inventory first decreased, then remained constant; afterwards the opposite becomes true: production is higher than sales.

The minimum inventory of 1,900 units is above the minimum safety limit.

Whether the maximum of 4,200 is acceptable or not from the point of view of storage facilities, working capital, etc. should be decided by management.

If, now, it were decided that the minimum safety limit should be higher than 1,500 units, let us say, 2,350 units, for example, the above production budget would not be acceptable.

It would be necessary in such a case to increase production during

TABLE IX  
SEASONAL ADJUSTMENT: CASE 1

	<i>Sales Budget</i> (1)	<i>Safety Limit 1,500</i>		<i>Safety Limit 2,350</i>	
		<i>Production Budget</i> (2)	<i>Inventory Budget</i> (3)	<i>Production Budget</i> (4)	<i>Inventory Budget</i> (5)
January	800	1,000	4,200	1,000	4,200
February	1,000	1,000	4,200	1,000	4,200
March	1,200	1,000	4,000	1,000	4,000
April	1,600	1,000	3,400	1,000	3,400
May	1,700	1,000	2,700	1,200	2,900
June	1,500	1,000	2,200	1,200	2,600
July	1,300	1,000	1,900	1,200	2,500
August	1,000	1,000	1,900	880	2,380
September	800	1,000	2,100	880	2,460
October	700	1,000	2,400	880	2,640
November	700	1,000	2,700	880	2,820
December	700	1,000	3,000	880	3,000
TOTAL	13,000	12,000		12,000	

the month of May, at latest, to avoid the scheduled decrease of inventory below the safety limit of 2,350 units.

Depending on the circumstances and the other possible productions that could be scheduled to compensate for the variations in the production of the item considered, depending also on management's policy with regard to the acceptable maximum of the inventory budget, the budgeter will prepare the best adapted scheme of production. Many different solutions can be considered. A possible one is portrayed in Table IX (Col. 4). It provides for three levels of production, namely:

1. From January 1 to April 30                      1,000 units a month
2. From May 1 to July 31                            1,200 units a month
3. From July 31 to Dec. 31                        880 units a month

By absorbing the required increase or decrease of production over a period of months, the range of variation in production is kept to a low figure (minimum 880; maximum 1,200).

This schedule of production is portrayed in Figure 21. A comparison between Figure 20 and Figure 21 illustrates to what extent a higher safety limit is a burden to budgeting (higher average level of inventory, more levels of production).

CASE 2 If management's policy is to close the plant for vacations, maintenance, and inventory accounting, as more and more organizations are now doing, production should be adjusted to compensate for the vacation period.

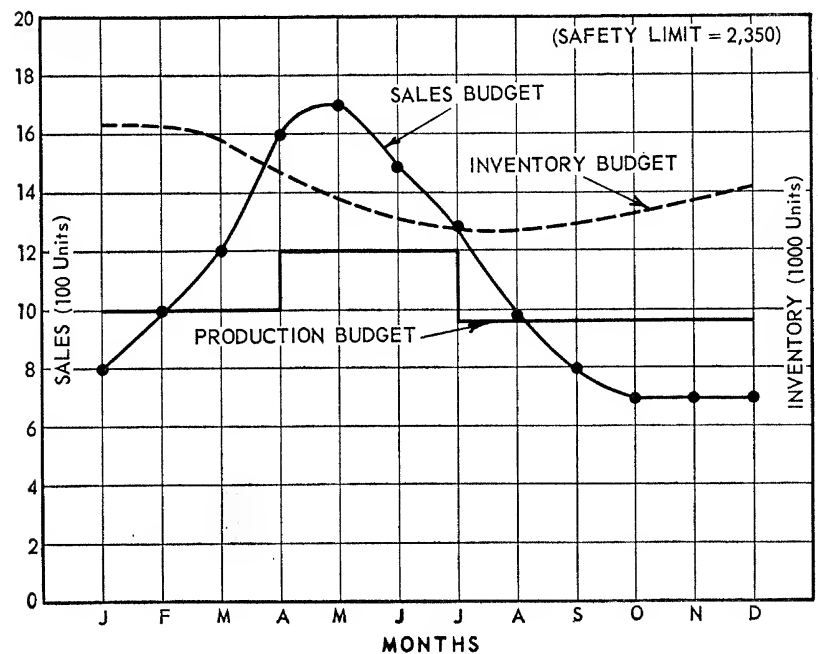


Figure 21. Comparison of Monthly Budgets of Sales and Inventory with Two Levels of Monthly Production

In Table X, based on the same original data as Table IX, production has been stabilized, as in the previous case, at about 1,000 units a month. The loss in production during the vacations (two first weeks in July; i.e.: 500 units) is compensated by an increase of 250 units a month at another time of the year (March and April in this case). Figure 22 illustrates. (Safety limit: 1,500 units.)

CASE 3 Some businesses face extreme seasonal variations. The data given in Table XI describe such a situation. Seventy percent of the sales are made during the peak, in April. To avoid an excessive accumulation of inventory, management may decide to run the production during the three months preceding the peak in January, February, and March. (See Table XI.) The nine other months are then left entirely

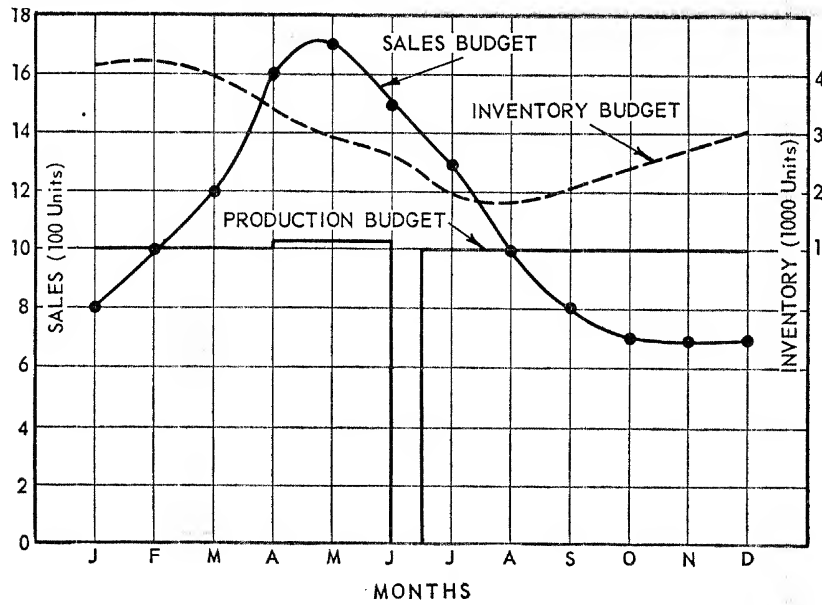


Figure 22. Comparison of Monthly Budgets of Sales and Inventory with Stabilized Production Interrupted for Vacations

TABLE X

SEASONAL ADJUSTMENT: CASE 2

(Safety limit: 1,500 units)

	Sales Budget	Production Budget	Inventory Budget
January	800	1,000	4,200
February	1,000	1,000	4,200
March	1,200	1,000	4,000
April	1,600	1,000	3,400
May	1,700	1,250	2,950
June	1,500	1,250	2,700
July	1,300	500 *	1,900
August	1,000	1,000	1,900
September	800	1,000	2,100
October	700	1,000	2,400
November	700	1,000	2,700
December	700	1,000	3,000
TOTAL	13,000	12,000	

\* Last two weeks

free of the burden of producing this product. A minimum inventory is maintained throughout the year (for instance, 300 units considered as the minimum safety limit after the seasonal peak is over). The plant may either be used for another production or closed after the three months scheduled for production are over.

Many such highly seasonal businesses will endeavor to find a complementary line of products. Others will deliberately close the plant. Toy manufacturers, with the Christmas seasonal peak, offer a well-known example of such difficulties.

An alternate solution would be to produce during the whole year at a lower rate and to carry over the production to satisfy the high seasonal peak. This, however, will generally be an expensive proposition due to the cost of keeping the inventory and also a dangerous one because of the risk of that inventory becoming obsolete (following a change in circumstances or style) or excessive (following a change in economic conditions).

In some cases a similar type of situation is found, which is due not to a highly seasonal sales market but to a highly seasonal supply. The effects are the same. Such is the case, for instance, of the beet-sugar mills. Production runs from the middle of October to the first part of February. Except for maintenance work, the plants are then closed from February to October.

TABLE XI

## SEASONAL ADJUSTMENT: CASE 3

	<i>Sales Budget</i>	<i>Production Budget</i>	<i>Inventory Budget</i>
January	200	4,000	4,100 *
February	300	4,500	8,300
March	1,000	4,500	11,800
April	9,100	0	2,700
May	1,600	0	1,100
June	200	0	900
July	100	0	800
August	100	0	700
September	100	0	600
October	100	0	500
November	100	0	400
December	100	0	300
TOTAL	13,000	13,000	

\* This figure includes a carry-over of 300 units.

## SUMMARY

The few cases considered above are simply illustrative of possible solutions to the problem of production and inventory budgeting.

In professional practice one encounters such a variety of situations and, for each of them, such a variety of possible solutions, that no attempt is made to describe more than general principles and methods. The reader will have to apply such principles and methods to the specific problems of budgeting he has to solve.

The guiding principles of approach can be summarized as follows:

1. *For each product (or group of products)* the budgeter determines a standard inventory turnover, which indicates at a given time of the year the desirable ratio of sales to inventory. If there are 20 groups of products there may be 20 standard inventory turnovers.
2. The ratio for each product (or group) is applied to the forecast of sales of the product (or group) to determine the increase (or reduction) of inventory required to bring the inventory on hand of that product (or group) at the beginning of the year to a level related to the sales budget.
3. The yearly production budget is equal to the sales budget plus (or minus) such an increase (or reduction) of inventory.
4. The budgeted annual production is distributed over the months (or weeks) of production with due consideration to the need for:
  - a. Stabilizing production in accordance with management's policy.
  - b. Constantly keeping the budgeted inventory above the minimum safety limit.
  - c. Constantly keeping the budgeted inventory at the lowest possible level (the other requirements being duly satisfied) and in any case below a maximum determined in accordance with management's directives.
5. The actual production of each item is then scheduled within the production budget on the basis of manufacturing orders issued after consultation with every department concerned. Thus, the combination of all the individual orders for a given period should, under the responsibility of the production-regulating officer, be adjusted to the production budget as a whole, with due consideration given to plant capacity, facility, and to orders received.

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## ■.VII

### MANUFACTURING EXPENSE

**T**HE PRODUCTION budget is the basis on which the manufacturing expense budget is prepared. All the daily activities of the manufacturing organization, such as the purchase of raw material, the hiring of personnel, the maintenance of machinery, etc. occasion current expenses. The rational relation of these expenses to the rate of production is one of the important considerations in preparing the manufacturing expense budget.

As the reader knows, and as may be expected, the trend of actual sales often reveals that market conditions have changed substantially since the time the sales forecast was prepared. Even so, unless a mistake has been made or unless totally unexpected events create a deep disturbance of the market, the difference of actual sales from budgeted sales will remain within comparatively small limits. It will often remain within a few percents of sales. Such a departure of actual sales from budgeted sales will not, in general, call for fundamental changes in the production policy but only for adjustments of schedule within the



previously established frame of reference and according to methods that will be studied in Chapter X. In this chapter, as in the preceding and in the following one, the case is taken of actual sales confirming the sales forecast. This is for the purpose of establishing a base line from which variations in the several inventories, production, and expense budgets may be determined as sales fluctuate about the central trend.

This chapter deals with manufacturing and the following one with selling and administrative expense. This is to say that the authors have followed the traditional classification in manufacturing, selling, and administrative expense. At the same time, they are aware of the need for supplementing such a classification which is not entirely adapted to the need of modern industry, as will now be shown, before specifically discussing the subject of this chapter.

#### I. A FEW REMARKS ON EXPENSE CLASSIFICATION

As a rule, there is no standard uniform accounting system applicable to every business. Each business which is not subject to special administrative requirements, such as the ones governing the public utilities, for instance, follows its own methods. There are, however, some strong accounting traditions which have determined at least a general pattern of presentation of data. Among the few standard rules practically always accepted is the one that divides the expense into three broad categories with which the reader is certainly familiar, namely:

1. The manufacturing expense (also called the cost of sales, or cost of goods sold)
2. The selling expense
3. The administrative expense.

The practical advantages of this traditional classification are well known. Among such advantages, one of the most significant is that of being universally accepted. Much inconvenience results from the lack of standardization in accounting. It seems proper not even to consider the possibility of abandoning one of the few principles that are accepted by all. At the same time, one cannot help being disturbed by the fact that this classification, inherited from the past, does not by itself answer the need of control required by modern industry.

Perhaps the most vital problem of industry today is that of knowing the behavior of costs in relation to production. When the production *rate* increases, some costs increase proportionally and somewhat automatically: these are the *variable costs*; some do not increase proportionally or automatically but by steps when the production rate reaches

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certain levels and management takes certain decisions: these are the *regulated costs*; some do not increase with the rate of production: these are the *fixed costs*. For instance: the monthly annual direct-material expense varies with the amount of monthly or annual production; it is a variable expense; the monthly rent of the building is a fixed one; the total monthly salaries of supervisors, the number of which at any time depend on management's decision, is a regulated expense.

What is true of an increase in the rate of production is also true of a decrease. Variable costs will decrease automatically and proportionally to the reduction in production. The regulated costs are adjusted at intervals to declining production levels. The fixed costs cannot be reduced.

In the past, when the effective demand for a product was diminishing, the producer would reduce production and, by accepting a reduction in the margin of profits, could without excessive difficulty reduce his price at the same time. The modern producer who tries to adjust his business to a decreasing effective demand faces the dilemma that, whenever he reduces his rate of production, the total cost per unit of production increases more rapidly because of the impact of these costs that do not decrease with production.

*His costs tend to increase precisely at the moment he faces the necessity of reducing his selling price.* Hence the need for a more precise control of costs.

The traditional classification of expense data in manufacturing, selling, and administrative expense is extremely useful for the purpose of auditing. It tells very significantly what has happened and where it did happen during a given period, while a certain quantity of goods was produced. It does not, however, give sufficient indication as to what would have happened if the quantity of goods produced had been different. The variable, regulated, and fixed costs are not identified.

For budgeting purpose this is precisely what should be done.

The secret of accurate expense budgeting is the ability to adjust past data to forecast changes.

The first step is to forecast the change, for instance, to forecast the future sales, the future wages, the future cost of raw material, etc.

The second step is to determine how such changes will influence the expense of the business, which implies a knowledge of the break-down in variable, regulated, and fixed expenses. Past data will serve as a guide, only insofar as the probable influence of the change can be determined. It is one thing to know that the foreman's salary will in-

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crease by 10 percent and another thing to know the influence of such an increase on the total unit cost of each refrigerator to be produced next year at a rate of production greater by 7.5 percent than last year's rate of production.

In other words, budgeting requires a break-down of expense that will show the *functional* behavior of the expense in relation to production.

While keeping the traditional frame of expense classification, it is therefore in order to consider each expense in terms of its functional relationship to production. This will now be done [For an extended treatment, see *Eco. Ind. Mgmt.*, 240].

## II. DIRECT LABOR

The three main items of manufacturing expense are: direct labor, direct material, and factory expense.

The direct-labor expense consists of the wages paid to those workmen who are engaged in specific productive operations or who are in control of specific processing operations. The wages paid to the workmen operating a milling machine or a band saw or a power hammer, for example, are direct-labor cost; but, the wages paid to tool-makers, storekeepers and others who render important service in the factory are not direct-labor cost. They are parts of factory expense. (See page 132.)

To budget direct labor is to evaluate the amount of direct labor that will be required for the fulfilment of the production budget, which, as shown in the previous chapter, was prepared in relation to the sales forecast, the inventory on hand, and the standard inventory turnover.

The production budget is expressed in terms of physical units or of dollars (standard or actual production costs). To budget direct labor is therefore to translate the production budget in terms of direct-labor units of measurement.

There are two ways of measuring direct labor, either by using the dollars of wages paid to the worker or the number of hours required to do the job. Depending on conditions of operations, accounting procedures, and management preference, either one or both may be adopted. The direct-labor dollar and the direct-labor hour are both of current use in budgeting.

### 1. *Direct-labor dollar*

The cost of direct labor per unit of production is generally well known in industry, so that, as a rule, there will not be any serious diffi-

culty in establishing the direct-labor dollar budget on the basis of the production budget.

The direct-labor dollar budget should be established not only for the plant as a whole but department by department.

This break-down is helpful for measuring production in each department, as will be seen later (See Appendix D, page 289). It is also required for good management's purpose; for the direct-labor budget, handed to each department at the beginning of the period, will be the basis of its employment policy. As was seen in the preceding chapter, the production budget is established at various levels, which remain constant over a substantial period of time. The direct-labor expense budget which directly reflects the production budget is also constant over substantial periods of times. So is also the employment policy (hiring and laying off) followed by the various departments, which is one of the greatest if not the greatest reward and profitable result of budgetary control.

The direct-labor expense per unit of production is sometimes known only empirically on the basis of past experience or rough estimates in the case of new products. More and more, however, this expense can be estimated with accuracy by the use of standards determined by time-and-motion engineers, with or without participation of representatives of the workers. These standards are standards of quantity of production based on standard wage rates.

Whether such standards are used or not, there will be some difference between budgeted and actual direct-labor expense. It is important to remember that the difference may be the total result of two distinct causes, namely:

- a. A difference between the actual performance of the worker on the job and the performance that was expected from him by the budgeter.
- b. A change in the wage rates.

It is a good policy to design the accounting system in such a way that the variance between actual and budgeted direct labor will be reflected in two distinct variance accounts, one for the variance due to the actual performance on the job, one for the variance due to a change in wage rates. This will clearly show the facts as they are, opening the way for appropriate managerial decision.

Such an accounting procedure is facilitated by the use of standard cost accounting. The businesses which do not operate on standard costs can open such variance accounts, however, for statistical purpose only, without fundamentally changing their accounting methods.

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## 2. *Direct-labor hour*

For budgeting purpose it is obviously necessary to estimate the direct-labor expense in terms of dollars. It will sometimes be advisable also to compute the direct-labor budget in terms of hours of work. This will be greatly facilitated if the standards previously mentioned are available.

The reasons for budgeting the direct-labor hours are both technical and psychological.

Many cost-accounting systems are based on the allocation of overhead cost on the basis of direct-labor hours. This method should be used with some discretion. Obviously, if the productive departments of a factory vary widely in the nature of equipment and skill of operators, no average expense per productive hour will be indicative of the real factory expense of any department nor therefore useful in cost determination or in budgeting. At the same time, the time factor is certainly most important in every respect in manufacturing. It is also a fact that the "hour of work" is a tangible unit of measurement that appeals to supervisors. The budget may appeal more strongly to them and therefore be more likely to be taken into consideration if it is marked in terms and units they best understand. This is especially true for low-ranking supervisory personnel. Such psychological factors should be given the greatest consideration by the budgeter. An expense budget that is not fully understood and respected by the production personnel is absolutely without value. More will be said on this subject in a subsequent part of this book. (See Chapter X.)

## 3. *Direct labor as a yardstick of production*

Direct labor is in most manufacturing industries so closely related to production that it often becomes its actual yardstick. As such, direct labor is more than just an item of expense and will be considered later. (See Appendix D.)

# III. DIRECT MATERIAL

## 1. *Definitions*

The direct-material expense is the cost of the material which enters into and becomes part of the product. This is to be distinguished from the cost of those materials which are consumed or used during the manufacturing operations, such as oils, waste, taps and dies, coal, water, gas, etc. The cost of these materials is not part of materials cost, but is an item of factory expense to which reference is made later.

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It is important to define what constitutes the items of the direct-material cost before attempting to budget the expense. In fact, the valuation of the direct material is one of the delicate matters of cost accounting.

The cost of materials consists of the purchase price, plus freight and trucking charges incurred in conveying them from the place of purchase to the storeroom in the factory. This is the real cost of the material. However, it is not always convenient to apply freight and handling charges to specific materials, particularly when freight, express, and trucking bills include miscellaneous materials delivered. Accordingly, materials cost, for practical purposes, is often taken as the purchase price, and the handling charges are listed as items of the factory expense. Sometimes also such charges will be added in the form of standard costs.

Another and even more fundamental difficulty arises when the "purchase price" is considered. If a plant carries a substantial inventory of raw material and if it takes a substantial length of time between the time the raw material is purchased and the time it is processed, the purchase price of the raw material being processed may be difficult to determine, because of the possible fluctuations on the commodity markets.

Various methods are actually being used in cost accounting to solve the problem. Such methods are known as the "Average Cost," "First-In, First-Out" (FIFO), "Last-In, First-Out" (LIFO) or "Identified Lot Cost."

In budgeting, it is necessary to take in consideration the methods of accounting actually followed in the business being budgeted. The rule is that the budgeter should attempt to estimate the direct-material expense that will be actually debited to the account "Direct Materials" at the time the goods are being processed. In practice, when there are many raw materials handled, many purchases made during the year, and substantial variations of prices, it will be necessary to use standard costs of direct material. In such a case, the same standard is used both for cost accounting and budgeting purposes. Differences between the standard and actual cost of material are absorbed in variance accounts, according to the usual methods of accounting.

It will be a good policy to use such variance accounts to determine the responsibility of the various departments of the organization. For instance, one variance account should show the difference between actual and standard that is due to a variation in the purchase price. This variance will be, for good or bad, a measure of the performance of

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its duty by the purchasing department. Another variance account will absorb the difference due to the quantity of material actually used, as compared to the preestablished standard and thus give a yardstick by which to measure the performance of the production department. Other variance accounts may be devised to serve specific purposes. For instance, in a company where the freight was an important item and where a choice had to be made in each instance between various means of transportation, some of which were much less expensive than others which, in turn, were more easily available, it was found convenient to have an employee responsible for the transportation of the raw material. His performance was measured by a special variance account which was debited by and credited with any difference between actual transportation cost and the preestablished transportation standard. In fact, this procedure was the origin of very sizable savings in transportation costs in this particular business.

## *2. Direct-material budget estimates*

Thus, it can be said that the budgeter should endeavor to forecast the actual amount that the account "direct-material expense" will show at the end of the year, in accordance with the methods of accounting actually followed by the business, his forecast being based on the production budget previously determined.

The production budget is expressed either in dollars or in physical units of production (if not in both terms). Budgeting direct material is translating the production budget in terms of appropriate units by which direct material is being measured in the business being budgeted: physical units or standard cost or actual cost on the basis of a specific method of valuation (LIFO, FIFO, etc.), with or without adding actual or standard transportation costs.

In most industries, the quantity of raw material needed per unit of production is determined with great accuracy. The budgeting of the quantity of raw material needed for the fulfillment of the production budget will not, in general, be a serious problem. The evaluation of the expense in relation to the quantity may require some computation by the accounting and the purchasing departments, but will not present any fundamental difficulty. The budgeting of the direct-material expense, based on the production budget is, therefore, as a rule, a comparatively easy task.

It is certainly clear to the reader that the budgeting of the direct-material expense as just described is distinct from the purchasing pro-

gram of raw material which, because of its close relationship with cash problems will be considered with the cash budget. (See page 226.)

#### IV. FACTORY OVERHEAD

##### 1. *General considerations*

The two classes of manufacturing expense (direct labor and direct materials) which were considered above, as a rule—particularly in the mechanical manufacturing industries—vary directly with the rate of production. In the process industries direct labor tends to be constant over very wide ranges of production because of the nature of the operations in such industries. The third class of manufacturing expense which we are now to consider, namely the factory overhead, is more difficult in character. It includes some items which are variable, some which are fixed and some which are regulated or adjusted to higher or lower levels for higher or lower *ranges* of the rate of production. The fundamental classification of expense as variable, fixed, and regulated was briefly described at the beginning of this chapter. We will now see how this classification facilitates the budgeting of the factory overhead.

The problem is: given a certain production for a given future period, what will be the factory overhead (total and broken down by departments and by items)?

The answer to this question requires a study of the behavior of costs in relation to the rate of production. It is true that variations in cost may also be due to variations in the prices of materials or wage rates. If such variations are forecasted at any time during the budgeted period, the budgeter need simply make the necessary adjustments in terms of percent of increase or decrease of the factory expense budget. No special difficulty is involved in this operation.

The following discussion will therefore be focused on the problem of cost variation in relation to the rate of production.

##### 2. *The pattern of variation*

The *fixed expense* which does not vary with production is budgeted as for the previous period, unless some fundamental changes have been made involving fixed charges. If, for instance, some new equipment has been bought, the depreciation expense is increased. The budgeting of the fixed expense does not as a rule encounter any serious difficulty.

The *variable expense*—the same can be said of the variable component of the factory overhead (such as indirect material). Past records will generally provide the necessary data. As the variable expense varies

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directly with production, the data will easily be recomputed in terms of the future rate of production, according to the production budget.

*The regulated expense* is the one that may offer some difficulty to the budgeter.

The regulated expense, unlike the variable one, does not vary directly with production; and, unlike the fixed expenditures, does not remain constant for all rates of production. It does vary by steps, according to managerial decisions. This implies a lack of automatism. At the same time, management is free in its decision only within certain limits. For instance: a slight increase in production does not require the immediate hiring of more supervisors; a more substantial increase may render production difficult without increasing the supervisory staff; but management may decide to do without it. Yet, there is a limit. Above a certain increase in production, management must hire more supervisors lest the whole organization break down.

Experience shows that, in fact, the structure of a given business, the traditions of management, in short all the factors that combine to give a business its special individuality and make it different from all others, have the effect of imposing a certain pattern of variation upon the regulated expense of a business, as is also the case with the fixed and variable expenses.

As a result, the variation, in relation to the rate of production, of the total expense (variable, fixed, and regulated) and the variations of specific expenses (by categories: fixed, regulated, or variable; or by department; or by items) all follow a definite pattern [*Eco. Ind. Mgmt.*, IV & VI].

This pattern, the use of which for budgeting purpose is obvious, can be shown graphically for each of the three fundamental classes of expense, as follows:

The *variable expense* of manufacture tends to be related to the rate of production as shown in Figure 23. In this case the expenses of labor plus materials are found to be along the line A — B as monthly production varies between the annual rates of 40,000 and 70,000 units. The extension of the line of trend A — B passes through the origin. The equation of the line is

$$\text{Expense} = bx$$

in which

$x$  = the annual rate of production

and

$b$  = the slope of the line A — B

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Thus, when the annual rate of production is 70,000 units the expense is

$$\frac{\$300,000}{70,000 \text{ units}} = 4.285 \text{ dollars per unit.}$$

Accordingly when the annual rate of production during any month is 50,000 units, the expense should be

$$\begin{aligned} \text{Expense} &= 50,000 \cdot 4.285 \\ &= \$214,250 \end{aligned}$$

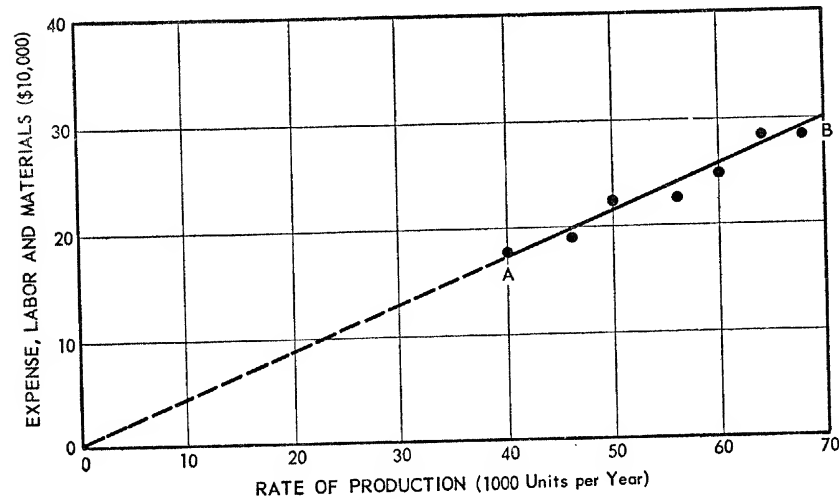


Figure 23. Variable Expenses of Manufacture

The *fixed expenses* such as rent, taxes, insurance, and depreciation, which are established in amount for any given year, are related to other factors than the rate of production and hence their relation to the rate of production will appear as shown in Figure 24.

The nature of *regulated expense* may be illustrated by the following case. In studying the expense of foremanship in a certain plant for a period of years, it was found that, omitting the war years, this expense varied in relation to the direct-labor annual payroll as plotted in Figure 25. Thus when the direct-labor payroll varied from about \$750,000 to \$1,250,000 per year the expense of foremanship averaged about \$60,000 per year; when the direct-labor payroll varied from about \$1,600,000 to \$2,000,000 as it did in the years 1937, 1940, 1941, the expense of foremanship was nearly constant at the level of \$80,000 per year. After the

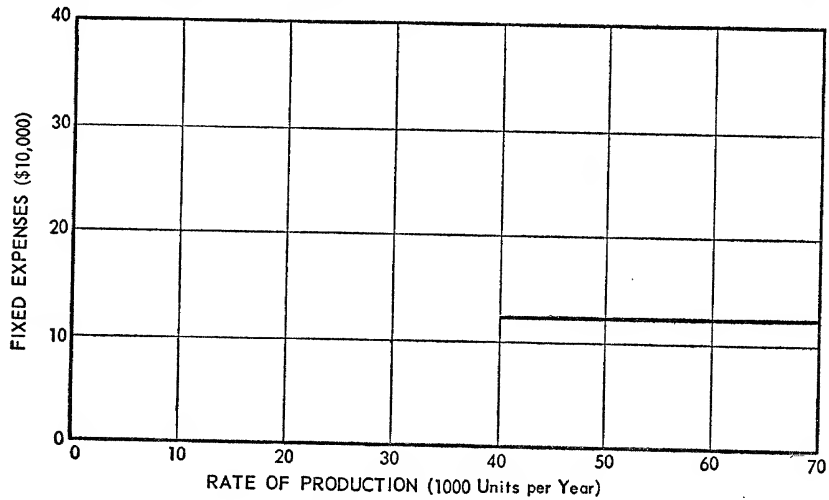


Figure 24. Fixed Expenses of Manufacture

war, during which contracts were taken on a cost-plus basis, and for the years 1947 and 1948, the direct-labor payroll varied from about \$2,500,000 to about \$2,650,000 but the expense of foremanship remained at the constant level of \$216,000. Thus, over this span of years, as production measured by the direct-labor payroll varied from \$750,000 to \$2,650,000, there are found three distinct levels of foremanship expense,

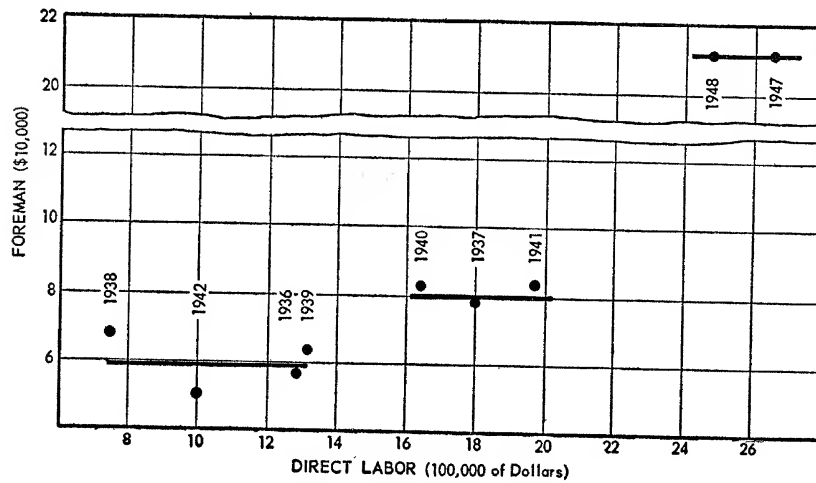


Figure 25. Regulated Expenses of Manufacture

which remained practically constant for definite ranges of production. Incidentally the great increase in the level of this expense which was typical of many in this plant during the years of 1947 and 1948 and which appears out of line with the increase in productivity, was the reason for this investigation.

The *fixed and regulated expenses together* constitute the *constant expenses*. The regulated expenses are constant over an appreciable

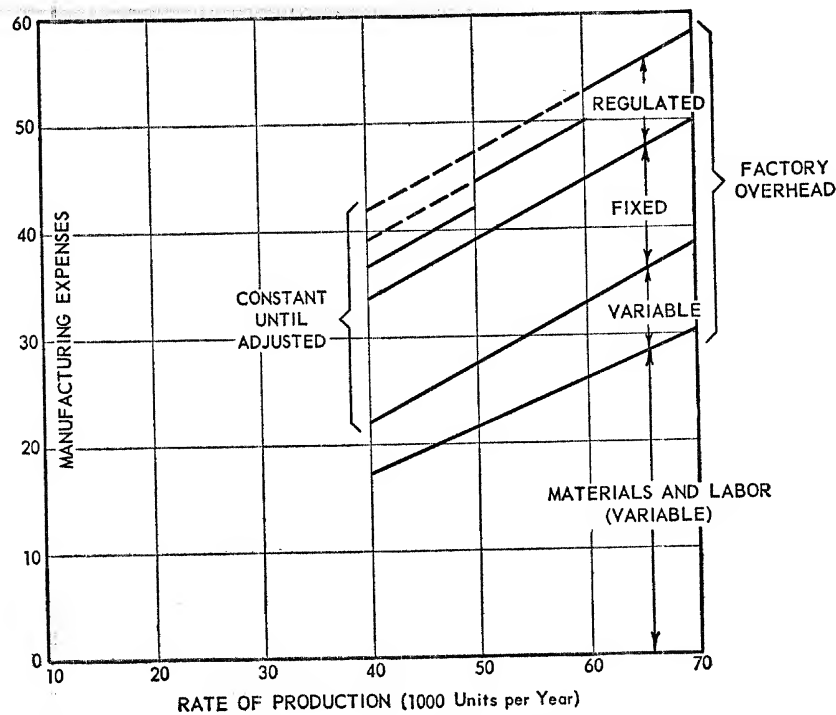


Figure 26. Total Factory Expenses

range of rates of production and remain constant by nature until adjusted by managerial policy. If now the items of expense in the factory overhead are classified as fixed, variable, and regulated, and the rate of variation for the total of the variable expenses and the increments of adjustment for the regulated expenses are related to the rate of production, the grand total of the factory overhead from the minimum to the maximum rate of production will appear in form as part of the manufacturing expense as shown in Figure 26. Here are found the variable,

fixed, and regulated portions of the factory overhead which must be clearly identified and their relation to the rate of production determined as necessary steps to the establishment of their budgetary control. This is the problem which will now engage our attention.

The factory overhead is made up of a number of expense items. It is not unusual to find as many as 100 separate account numbers under this heading. These should be budgeted by items, by departments, by the character of their relation to the rate of production (fixed, variable, regulated) and by such other classifications as may be useful for control purposes in particular types of industries. Classification by items is necessary for detail control. Classification by both productive and service departments is necessary for the assignment of responsibility for control. Classification by character of variation with production is necessary for purposes of control of the economic characteristics of the business, particularly the gross profit and the break-even point, since these groups are *functionally* related to the rate of production and to managerial policy. The prime variable (production) against which these items and groups of expenses must be measured will be either the physical units of production, or the standard direct-labor hours incurred in production, or the actual direct-labor dollars of sales or the dollars of standard costs, etc., whichever is most applicable according to the nature of the products made, and the system of cost accounting used. [For more details, see Appendix D.] These expenses will also be influenced from time to time by changes in prices for materials and services. Accordingly, any budget of factory expense established to measure the variation of such expense in total or in detail, with the rate of output, must be understood to be based on specific unit prices for materials and labor. Any changes in unit prices must therefore be reflected in the budget estimates. The range of production to be covered will be that previously estimated in the production budget.

### 3. *Procedure for budgeting*

The factory overhead budget is preferably set up in cooperation with the heads of the several productive and service departments, for the reason that their participation in preparing the budget results in getting "grassroots" data on each department and establishes confidence and respect for the budget when issued. The department heads should be requested to give their estimates for those expenses for which they are responsible, which is usually the amount of indirect labor and the quantity of indirect materials. Experience has demonstrated that in a majority of cases the controller's office, being more statistically minded,

is in a better position to suggest the probable expenses for each item for each department for a specified rate of production. In that event the budget requests of the several heads of the productive and service departments should be issued on a prepared form on which the estimates of the controller's office are recorded for criticism, comment, or approval.

Such consultations and use of graphical representations as the ones previously described will ultimately result in the establishment of the factory expense budget in its final form, item by item, division by division, department by department.

It has been found convenient to prepare the yearly manufacturing expense budget on a general purpose worksheet such as the one reproduced in Figure 27, rather than to use specific forms. (In fact, this all-purpose worksheet can also be used for sales budgeting.) Specific forms are then used for weekly control reports.

#### 4. *Control of the budget*

One of the essential purposes of the whole budgetary procedure is to define clearly the responsibility for expenditures.

Each department or division head who is accountable for expenditures and who has the authority to control expenditures should know each month, or even each week, what the items or accounts for which he is responsible should be and what they actually were after the month's operations. Any significant difference between actual and budgeted expense should be investigated. For this purpose a series of control forms after the general pattern of Figures 28 and 29 have been found acceptable.

Such forms may not only itemize the accounts such as indirect labor, indirect materials and supplies which an operating executive is responsible for maintaining within their prescribed limits but also those accounts such as insurance and depreciation over which he cannot exercise control but which are assigned as overhead to be carried by him.

As a rule, it is found convenient to make a distinction among the operating executives. Higher executives, such as plant managers, general foremen, and division managers, should preferably be given a complete picture of the situation, so as to be informed as to the total cost of operating their plant or division.

Department foremen, on the contrary, are generally more interested in following the costs for which they feel directly responsible. The forms in Figures 28 and 29 have been designed to serve these purposes.<sup>1</sup>

<sup>1</sup> These two forms were not designed for the same company.

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		TOTAL YEAR		2 MONTHS		3 MONTHS		11 MONTHS		12 MONTHS		THS	
LINE NO.				JAN.	FEB.	ACCUM.	MAR.	NOV.	ACCUM.	DEC.	ACCUM.	LINE NO.	
1												1	
2												2	
3												3	
4												4	
5												5	
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100												100	

Figure 27. General Purpose Budgeting Worksheet

CORPORATION

ST. LOUIS PLANT

Month Ending March 31st, 1947

SCHEDULE F ANALYSIS OF PLANT OPERATIONS

Item	Acc. No.	EXPENSES	THIS MONTH			THIS YEAR TO DATE		
			Expenses	Budget	Unexpended in Roman Overexpended in Italic	Expenses	Budget	Unexpended in Roman Overexpended in Italic
1	.01	Raw Materials Used	13,482.12	15,114.82	1,632.70	38,642.41	45,344.46	6,702.05
2	.02	Direct Labor	5,502.21	5,690.50	188.29	16,523.84	17,071.50	547.66
3	.03	Foremen's Salaries	820.00	810.00	10.00	2,396.52	2,430.00	33.48
4	.04	Operating Supplies Used	719.83	1,177.50	457.67	2,491.16	3,332.50	1,041.34
5	.05	Packing Supplies Used	2,322.56	2,466.00	143.44	6,320.69	7,398.00	1,077.31
6	.06	Repairs Productive Depts.	1,650.77	1,660.00	9.23	4,958.42	4,980.00	21.58
7	.07	Fuel	1,428.29	1,443.75	15.46	4,360.19	4,331.25	28.94
8	.08	Steam Dept.—Labor and Expense	1,221.50	1,165.00	56.50	3,541.39	3,495.00	46.39
9	.09	“ “ —Repair and Maintenance	378.00	378.00		1,134.00	1,134.00	
10	.10	“ “ —Insurance, Etc.	114.43	97.00	17.43	314.43	291.00	23.43
11	.11	Power Purchased	2,280.40	2,740.60	460.20	6,538.94	8,221.80	1,682.86
12	.12	Elec. Power Dept.—Labor and Exp.	515.35	625.00	109.65	1,519.50	1,875.00	355.50
13	.13	“ “ —Repair and Maint.	171.00	171.00		513.00	513.00	
14	.14	“ “ —Insurance, Etc.	95.83	84.00	11.83	265.46	252.00	13.46





DEPARTMENTAL DIRECT AND INDIRECT WEEKLY PAYROLL EXPENSE REPORT									
DIVISION _____		SUPT. _____		FOREMAN _____		DEPT. _____		CODE _____	
DESCRIPTION	2 WKS	WEEK ENDING _____ WK. NO. _____				ACCUMULATED THRU _____ WKS. _____			
		ACTUAL		BUDGET		ACTUAL		BUDGET	
		TOTAL	% TO D.L.	TOTAL	% TO D.L.	TOTAL	% TO D.L.	TOTAL	% TO D.L.
Scrap (Memo)	1								
Excess Labor (Brown)	2A								
Excess Labor (Green)	2B								
Direct Labor—Job Rate	3								
Direct Labor—Day Rate	4								
TOTAL DIRECT LABOR	5								
Other Direct Labor	6								
305 Machinery & Tools	7								
306 Other Equipment	8								
Special Labor	9								
Miscellaneous	10								
TOTAL SPECIAL LABOR	11								
02 Supervision	12								
03 Group Lead and Instr.	13								
10 Clerical	14								
20 Set Up	15								
30 Inspection	16								
40 Handling	17								
50 Cleaning	18								
61 Learning	19								
62 Overtime Extra	20								
63 Night Shift Extra	21								
64 Make up Money	22								
70 Plant Maintenance	23								
80 Work for Others	24								
90 Waiting for Work	25								
90 Sundry	26								
TOTAL INDIRECT LABOR	27								
10 1 2 3 Supplies	28								
11 2 Small Tools—Made	30								
14 2 No. Tools (minor) Made	31								
20 2 3 Ind. Materials	32								
22 B 1 & Bldg. Fixt.—Rep.	33								
23 1 Mach.—Repairs	34								
23 2 3 Mach. & Bldg.—Main t.	35								
24 1 No. Tools—Repaired	36								
24 2 No. Tools—Altered	37								
28 Furn. & Fixt.—Repairs	38								
29 Misc.—Repair & Refin.	39								
32 Small Tools—Repaired	40								
31 Moving Expense	41								
80 Experimental—Product	42								
90 Experimental—Process	43								
Other Expenses	44								
TOTAL EXPENSE LABOR	45								
TOTAL IND. & EXP.	46								
TOTAL PAYROLL	47								
10 2 3 4 Supplies	48								
11 1 Small Tools—Purch.	49								
11 2 Small Tools—Made	50								
14 1 No. Tools (minor) Pur.	51								
14 2 3 No. Tools (minor) Made	52								
20 2 3 Ind. Materials	53								
24 1 2 No. Tools—Rep. & Alt.	54								
32 Small Tools—Repaired	55								
TOTAL EXPENSE MATERIAL	56								

FORM NO. 274-3 DEPT. \_\_\_\_\_ CODE \_\_\_\_\_

Figure 29. Form for Departmental Factory Expense Budget

The form in Figure 28 includes all the expenses of the St. Louis plant. It is sent to the St. Louis plant manager. The form in Figure 29 is sent to a departmental foreman. It includes essentially the items of expense for which the foreman can have a justified feeling of direct responsibility. To facilitate its immediate understanding, the data (actual as well as budgeted) are given both in dollars and in percent of direct labor.

In addition, the authors have found it convenient to prepare for the higher operating executives (plant manager, division heads, general

foremen) those graphs which will illustrate the fixed, regulated, and variable components of the different expense items.

To prepare such graphs, the items of the factory overhead should be listed on a worksheet by their account numbers, and the estimated amounts of each for the next annual budget period recorded, as shown in Figure 30. If the company operates several plants or divisions, a

### FACTORY OVERHEAD ANALYSIS

Period—Jan. 1–Dec. 31, 1948.

Account No.	Description	Amount for Period	Amount Each Item	
			Constant	Variable
21				
22	Local taxes	4,000	4,000	—
23	Packing supplies	24,000	—	24,000
24	Purchased power	30,000	5,000	25,000
25	Foremen	10,800	10,800 R	
TOTALS		\$600,000	\$240,000	\$360,000

Figure 30. Factory Overhead Analysis Worksheet

separate analysis for each plant or division, must be made. The total estimated constant (fixed and regulated) and variable amounts for each plant or division should then be added to obtain the factory overhead for the plant or division as a whole and its constant and variable components with the regulated items of the constant components marked with the letter R.<sup>1</sup>

Such graphs supplement the weekly budget schedules. Their double purpose is:

1. To give the executive concerned a general perspective of the behavior of costs in relation to the rate of production within his own organization (plant or division).
2. To enable him to inaugurate the necessary adjustments if the production budget is itself adjusted during the year, as will be more fully explained in Chapter X.

<sup>1</sup> Sometimes it is preferable to have three columns, one for each class of expense.

## ■ VIII

### SELLING AND ADMINISTRATIVE EXPENSES

**T**HESE EXPENSES have not been studied as functions of production because they are in the main composed of accounts which are regulated by executive decision. They also contain many items of fixed expense which are independent of the rate of production. The budgeting of these expenses, therefore, assumes a different character than that of manufacturing expenses, which the following considerations will make clear.

#### SELLING EXPENSES

Selling expenses are all those expenses incurred in creating a desire to possess on the part of the public, providing convenient places for procurement by the consumer, transporting the products to the places of procurement and collecting the money. The function of this division of operations of a business is to find the customers, deliver the products to them, and get the money. Creating the desire to possess the company's products is accomplished through advertising, personal

solicitation and good-will. Providing convenient places for procurement is brought about by the use of the company's own sales outlets or by contracting with others for the use of their outlets. Transporting the products from the factory to the places of procurement is done by rail, plane, truck, water-borne carriers, and by other means such as the mails.

All of these activities concerned with connecting up with the consumer are of a wholly different character than those concerned with the processes of production which have just been considered. Accordingly the establishment and control of the expenses associated with such activities are based on wholly different considerations. Yet upon examining these expenses, it is found that they fall into two principal categories: those which are constant in time as established by administrative policy, such as the annual appropriation for advertising, and those which vary directly with the quantity of output sold, such as commission on sales. Having established the general framework of sales policy, some of the constant expenses take the character of fixed expenses, such as the rent and other costs of maintaining sales offices. It is also characteristic of this class of business expense that there exists here the widest latitude for the exercise of administrative judgment and the greatest need for sound judgment both in determining the main framework of policy and in the adjustment and regulation of expenses to sales trends.

Another important characteristic of this class of activity is that its expenses must be controlled within the boundaries of gross profit margins. Furthermore, while the expenses of manufacture may be rationally related to the rate of production, many of the expenses of sales and distribution, such as advertising, do not relate themselves specifically to the rate of sales but only in a most general way. Accordingly, all of these circumstances set the problem of the budgetary control of such expenses in somewhat different terms than those which apply to the budgeting of manufacturing expenses.

How then may these expenses be budgeted and controlled?

#### THE BUDGET AS A WHOLE

##### 1. *The variable expenses*

An analysis of a company's records of expense for selling and distribution will reveal that certain items will vary directly with shipments made.

Among the accounts of this character are found:

- a. Freight and express
- b. Packing materials and supplies
- c. Commission on sales.

If the total sales of last year are divided into each of these items, the expense per dollar of sales of each are obtained. At this time a study should be made of each of these expenses, with a view to their reduction while maintaining the same quality of service.

In the case of freight and express a study should be made of railroad classifications and rates, with a view to obtaining if possible a more appropriate classification and a reduction in rates.

In the matter of packaging materials and supplies, a study should be made of new forms of packaging available and possible economies to be effected by the return and re-use of cartons or the use of pallets.

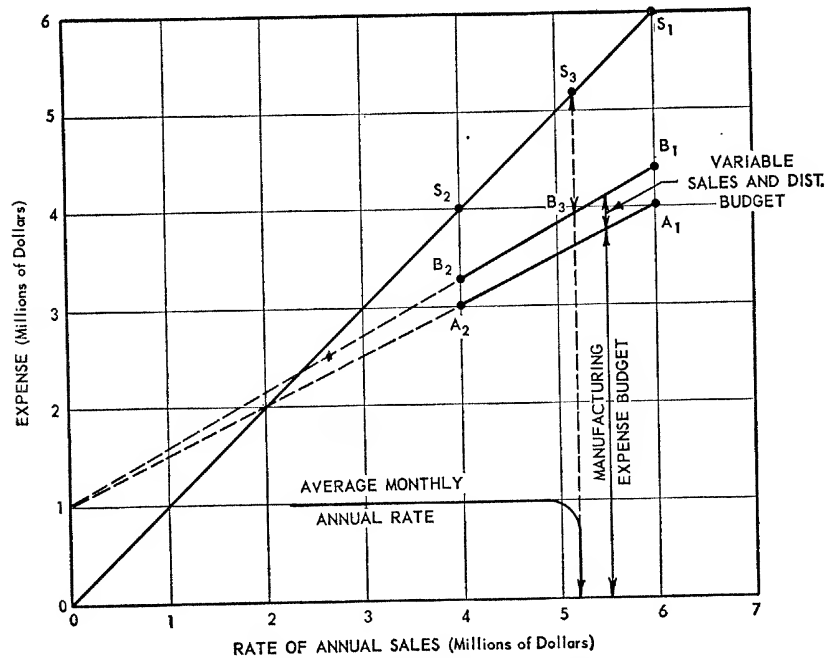


Figure 31. Sales-Expense Relationship for a Business as a Whole

In fact, a well-managed company will be making such studies from time to time as part of a program of expense reduction and the results of such studies, when acted on by the administration, are made available to the budgeting officer.

The net effect of a procedure as indicated above will be that reliable data are provided for budgeting the variable items of the total selling and distribution budget. At this time a graphic portrayal of expense

in relation to sales for the business as a whole will be helpful to the budgeting officer. Such a graph is shown in Figure 31. In this case the rate of annual sales varies from 4 to 6 million dollars. The annual manufacturing expense budget is,

$$\$1,000,000 + 50\% \text{ of sales}$$

The variable-expense items of the sales and distribution budget total \$400,000 for \$6,000,000 sales, or at the rate of 6% cents per dollar of sales. If the average monthly annual rate of sales is \$5,200,000, then it is found that the quantity  $S_3 - B_3$  is available for

1. The fixed portion of sales and distribution expense
2. The administration expenses
3. Profit from operations

From the above data the amount available for sales of \$5,200,000 is

$$\$5,200,000 - (\$1,000,000 + 56\% \text{ of } \$5,200,000) = \$1,253,333$$

Assuming for the time being that the administrative expenses have been budgeted, there remains the amount available for the constant expenses of selling and distribution and for the operating profit.

*2. The constant expenses*

At this point the constant portion of the expense of sales and distribution must be considered with reference to the operating profit aimed at. Among the items which come under review are those frequently classified as follows:

1. Salaries
2. Rent, heat, light, and depreciation
3. Traveling
4. Sales promotion
5. Telephone and telegraph.

These expenses are constant by administrative apportionment and are regulatable above certain minimums which are usually referred to as the irreducible minimums. This review should begin with a statement of the amounts of each of these items for last year. If the traveling expenses, for example, are analyzed on a mileage basis, and the daily cost for hotel accommodations is determined, it may be found that they are excessive and should be reduced and put under budgetary control. Every item of expense should be reviewed by the budgeting officer in

cooperation with the sales manager and definite schedules for each should be prepared for administrative consideration. The advertising and sales-promotion budgets as a rule are the ones concerning which administrative policy and decision are most important. If the sales budget should be reduced, what will be the effect on sales if the advertising appropriation is cut, say, 15 percent? Conversely, what increase in sales may be anticipated if this activity is stimulated by an increase of 20 percent in appropriation?

The whole program of sales distribution may come under review, and the question of sales expense by territories in relation to the sales in those territories may receive serious consideration. In order that discussions on such matters may be based on reliable data, the budgeting officer should have compilations of expenses by territories, districts, or other appropriate geographic divisions. In fact, the sales and distribution expense budgets should be built up from the data on focal points of distribution. This will now be considered.

### 3. *Regional budgets*

The profit from operations of the business as a whole is the sum of the profits from operations of each region. Accordingly, each region unit must be analyzed as to its expense characteristics and probable income from sales. Since the budgeting of sales has already been considered, our concern at this time is with the expenses. To illustrate procedure in this matter, a typical example will be taken of a company which has a central plant for the manufacture of its products and four regional divisions from which the products are delivered to regional customers and at which regional sales offices are maintained. A central general sales office is maintained at the plant.

In the first place it will appear that the cost of the product *delivered* will be different for each regional office, depending on its distance from the point of manufacture. If the product is shipped in bulk and packaged at the point of distribution, an additional expense factor must be budgeted against the cost of manufacture and preparation of the product as sold. This budgeted item will be different for each region. Some regions, particularly where sales do not justify a packaging department, may receive the product packaged and ready for delivery. Each regional office has its expenses for salaries, commissions, local advertising, rent, etc., as well as expenses of delivery to the customers of the region. Each regional office should also carry its proper portion of the expenses of the general sales office. As a result of all these circum-

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stances, the average monthly annual rate of sales and the corresponding expenses to maintain these sales, and the resulting profit *before administrative expenses* will be found to be different for each region. From these data a break-even chart before administrative expenses may be prepared for each regional office and thereby a better perspective of the total situation is obtained.

The budgeting officer will then have discharged his responsibility of obtaining the data, and organizing them to show the important and significant relationships. The budgets for each of the four regional divisions, when finally adopted, may then be tabulated according to the same general form such as shown in Table XII. This form may be expanded and modified to suit the needs of the particular business to which it is applied. Upon classifying the expenses into their constant and variable portions, it is found that the variable expenses are manufacturing expense and freight and express and all the others are constant. Accordingly, the sales required of each division to break even before administration expenses are approximately <sup>1</sup> as follows.

## DIVISION A

$$\begin{aligned}\text{Total expenses before} \\ \text{administration expenses} &= \$7,330 + \frac{77,500}{100,000} \cdot X \\ &= \$7,330 + 77\frac{1}{2}\% \cdot X\end{aligned}$$

where X = monthly sales

from which

$$\begin{aligned}\text{Break-even sales} &= \frac{\$7,330}{1 - .775} \\ &= \$32,580\end{aligned}$$

## DIVISION B

$$\begin{aligned}\text{Total expenses before} \\ \text{administration expenses} &= \$10,300 + \frac{55,000}{75,000} \cdot X \\ &= \$10,300 + 73\frac{1}{3}\% \cdot X\end{aligned}$$

$$\begin{aligned}\text{Break-even sales} &= \frac{\$10,300}{1 - .735} \\ &= \$38,868\end{aligned}$$

<sup>1</sup> The manufacturing expense is dependent on the total production.

## DIVISION C

$$\begin{aligned}
 \text{Total expenses before} \\
 \text{administration expenses} &= \$17,320 + \frac{88,100}{125,000} \cdot X \\
 &= \$17,320 + 70\% \cdot X \\
 \text{Break-even sales} &= \frac{\$17,320}{1 - .705} \\
 &= \$58,712
 \end{aligned}$$

## DIVISION D

$$\begin{aligned}
 \text{Total expenses before} \\
 \text{administration expenses} &= \$21,510 + \frac{94,400}{123,333} \cdot X \\
 &= \$21,510 + 70\% \cdot X \\
 \text{Break-even sales} &= \frac{\$21,510}{1 - .70} = \$71,700
 \end{aligned}$$

The above case is a much simplified one given to illustrate the method. In many cases there are found many expenses which are variable such, for example as commissions on sales. For such expenses, the budgeting officer may determine the rate of variation with sales, as illustrated for the manufacturing expenses in Chapter VII, and budget such expenses each month in accordance with sales. Budgeting by regions or divisions in this manner focuses attention on profits as well as sales and expenses. A company manufacturing and selling several products should budget sales, expenses, and profits *by products* for each region, if it hopes to maintain operations on a most profitable basis. Therefore in such cases the form such as shown in Table XII should be expanded so as to reveal the profitableness in sales of each product or type of product handled.

## ADMINISTRATIVE EXPENSES

These are all those expenses, other than manufacturing and selling, incurred in operating the business. They are, as a rule, constant expenses. When administrative officers are paid bonuses on the basis of profits then that expense is variable.

The budgeting officer in preparing the schedule of such expenses must be guided by an estimate of what each item of last year's expenses

would have been at current prices for supplies, current rents, and current charges for other items.

This estimate must be adjusted for all anticipated increases and decreases. A final schedule of administrative expenses, together with the anticipated break-even chart of the business, showing the trend lines of manufacturing, selling and administrative expenses, should then be reviewed and a schedule of adjustments in such expenses, as business increases or decreases should be formulated. The effects of such adjustments when reflected in the break-even chart will show the consequences in profits.

TABLE XII  
SELLING AND DISTRIBUTION EXPENSE

Monthly Average	Budget			Period Jan. 1-Dec. 31, 1950	
<i>Items</i>	<i>Div A</i>	<i>Div B</i>	<i>Div C</i>	<i>Div D</i>	<i>Totals</i>
<i>Average Monthly Sales</i>	\$100,000	\$75,000	\$125,000	\$133,333	\$433,333
Salaries	4,900	3,800	7,000	10,300	25,000
Rent etc.	300	180	250	350	1,080
Traveling	2,000	1,500	2,500	2,500	8,500
Advertising & sales promotion	1,600	1,800	2,500	2,800	8,700
Telephone & telegraph	30	20	70	60	180
Sales * overhead	4,500	3,000	5,000	5,500	18,000
Manufacturing expense	69,000	52,000	86,500	92,500	300,000
Freight & expense	2,500	3,000	1,600	1,900	9,000
Total expense	84,830	65,300	105,420	115,910	370,460
Profits before administrative expense	15,170	9,700	19,580	17,423	62,873
Percent profit	15.2%	12.9%	15.6%	13.2%	14.5%

\* The sales overhead, which is the expense of the general sales office, is apportioned to the divisions in proportion to their anticipated sales.

The annual budget summary of the administrative expenses for a certain company for the year 1949 is shown in Table XIII. The general unclassified expense of Account No. R113 contains a number of items of expense about which there is some doubt, both as to the probability of their being incurred and their amount if incurred. One of the items was the possible expense which might result from financing a proposed development program under consideration but not yet authorized. The budgeting officer sometimes encounters probabilities of this nature and in this case it seemed wise to anticipate the expense so as to be on the conservative side. Sometimes it is possible, when the operations contemplated in this account are not authorized, to adjust from this account to other accounts in which unforeseen expenditures eventuate, without the necessity of adjusting the total budgeted expenses.

TABLE XIII  
ADMINISTRATIVE EXPENSE

Budget-1949		
<i>Acct. No.</i>	<i>Item</i>	<i>Amount</i>
R 100	Salaries (administrative)	\$122,000
101	“ (accounting)	41,000
102	Engineering & research	66,500
103	Salaries (Patent Dept.)	9,000
104	Expenses “	500
105	Insurance	30,500
106	Legal & professional	6,000
107	Traveling expense	13,000
108	Stationary & supplies	5,700
109	Telephone & telegraph	6,200
110	Postage	5,200
111	Subscriptions & donations	500
112	Rent	8,300
113	General unclassified	18,600
TOTAL		\$333,000

# **PART III**

## **CONTROL AND ADJUSTMENTS**



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## IX

### SALES CONTROL—SALES QUOTA THE SALES-MIXTURE CHART

**S**ALES, inventory, production, and expense budgets have been studied separately for the purpose of simplification; their close interdependence has certainly not escaped the reader's attention. They are not to be considered as four distinct budgets but rather as the four main elements of the total budget of the business. Together they define the patterns of the several interrelated activities that the business is expected to follow.

For management purpose, each pattern of activity is of value only if it has a realistic character. Within reasonable limits of accuracy, the actual performance must follow the patterns or the patterns must be changed. This means control and adjustment; control of the actual performance in any case and also, if need be, adjustment of the budget.

Without control, the budget would be a simple recommendation to aim at a more or less clearly defined goal; without adjustment, it could easily become a meaningless overexpanded shell or, on the contrary, turn into a strait-jacket threatening the growth of the business. With

control and adjustment procedures, the budget can and should be a real and effective tool of management, a flexible and yet well-defined, solidly established frame of reference, a reliable and trusted guiding pattern.

Control obviously should precede any attempt at adjustment and should start with the sales, which are the basis and the justification for production. This chapter deals with sales control, starting with the sales-mixture control.

### I. SALES-MIXTURE CONTROL

In the majority of multi-product businesses, each dollar of sales does not bring the same amount of profit. Some sales are more profitable than others. If the "mixture" sold is rich in products on which the profit per dollar of sales is high, the total profit will obviously be greater for a given amount of total sales than if the mixture is composed essentially of products that bring a low profit per dollar of sales. Controlling total sales will therefore be quite often only the second step of sales control, the first one being the control of the *composition* of these total sales—which is generally known as the *sales-mixture control*.

In many businesses, the difference in profit margins among the various products sold is such that the sales mixture is the key to success or failure. A substantially unfavorable change in the sales mixture may mean a much smaller profit than expected or even a loss, even when the total amount of sales is equal to or greater than the budgeted one.

Too often, management gives second place to this problem when it should be given first attention. In a well-known corporation the authors recently recommended that a careful analysis of the sales mixture should be made. They were told that this was not necessary, as the profit made on each dollar of sales did vary "very little" from product to product. The corporation manufactures and sells about 250 different products. The authors, being unconvinced by the "very little" yardstick used for measuring the sales mixture, made a systematic analysis of sales and profit margins by products.

This study disclosed that in this company the direct profit (for definition, see page 158) made on each dollar of sales actually varies from about 20 cents up to about 80 cents on the dollar. Needless to add that, after this discovery, management's attitude changed and a tight control of the sales mixture was introduced. This case is given as an example, because it is not an exceptional one. The figure of total sales acts too

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often as a sort of magic, although, in fact, the real problem is to sell at a profit that will keep the organization running rather than reaching an impressive volume of sales regardless of profit margins. The first step is therefore to determine product by product the profit made on each dollar of sales. This requires a definition of what exactly is meant by "profit" and how it can be measured.

#### A. DIRECT COSTS—DIRECT PROFIT

Very generally, the control of the sales mixture is based on the measurement of the gross profit per dollar of sales made on each product. The gross profit is generally computed as the difference between:

1. The selling price of the product and
2. The sum of:
  - a. The direct-material cost
  - b. The direct-labor cost
  - c. A certain portion of the factory overhead, called the "burden" of the product.

This approach meets with the following objections:

1. The proportion of the factory overhead assigned to each product is determined on the basis of a decision which is unavoidably arbitrary in its character. Whatever the care taken in choosing the best-adapted basis for apportioning the factory overhead, (by direct-labor cost, selling price, prime cost, etc.) there is a necessarily wide margin of approximation and oversimplification.

2. It is true that the part of factory overhead that is supported by some of the products sold, let us call these the products of Group A, would have to be transferred to other products, such as those of Groups B and C, either totally or in part, should the sales mixture not include any product of Group A or should the assumed percentage of Group A products in relation to total sales be less than anticipated. The result is that to evaluate the final consequence of a change in the sales mixture, for instance a decrease in the sales of product A, it will be necessary to recompute the burden of all the products of the Groups B, C, etc.

At the same time, it should be clearly understood that the control of the sales mixture is distinct from the control of total sales. Improving the mixture (the "quality" factor) does not imply a reduction of the total (the "quantity" factor) but is an attempt to substitute more profitable lines for less profitable ones. The costs that, in final analysis, may

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serve as a guide to management are not those that will remain the same whatever the mixture is (the burden) but those that are specifically related to a given sales mixture, that is, which indicate their specific value for the business of such a sales mixture.

3. Finally, the allocation of the burden to each product tends to cloud the fundamental issue, which is: In most businesses, some lines of product distinctly offer a greater possibility of profit than others. Other things being equal, their sales should be encouraged.

From a practical point of view, only the businesses that have introduced an effective control of the sales mixture are in a position to recognize and reward accordingly the otherwise undetected efforts of the salesman who pushes the most profitable lines as compared to the salesman who, primarily concerned with volume, sells what the customer more readily accepts.

Such are the objections to the use of gross profit for the purpose of controlling the sales mixture. Gross profit, which is the difference between the selling price and the sum of direct-labor cost, direct-material cost and part of the factory burden, is obviously the one value to use when it comes to decisions involving expense control or pricing; but it is not adapted to the control of the sales mixture.

The authors have found it more convenient and effective to use instead the notion of *direct profit*.

The direct profit is the difference between the selling price of a product and its *direct cost*.

Direct costs are the costs that can reasonably be directly assigned to the manufacturing and sale of a product and are such that if the product was not manufactured and sold, they would not be incurred by the business.

Direct labor and direct material are, as a rule, among direct costs. Among the factory overhead costs, some can reasonably be directly assigned to a product. For the purpose of sales-mixture control, such overhead costs should be segregated and made part of the direct cost of the product.

It requires a thorough knowledge of operating conditions to recognize the direct costs among the factory overhead costs. No attempt will be made to give rules by which such a segregation can be compiled. It can only be stated that the budgeter should attempt to determine most of the costs that are incurred because of a product and that would not be incurred if its production and sales were discontinued. At the same time, the determination and compiling of the direct cost should

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not unduly complicate the accounting procedure nor be the cause of an excessive expense. This means that some direct costs are bound to escape detection or, being detected, escape recording.

The guiding rule is: The *direct costs* of a product are all the costs and only the costs that would not be incurred if this particular product were not manufactured. In applying this rule, the budgeter, realizing the unavoidable approximative character of any cost-accounting procedure, will have once again an opportunity of showing whether or not he possesses the most useful quality in budgeting practice, namely, a great amount of common sense.

As an illustration of direct cost, the following example is given from experience.

In a certain factory manufacturing plastic goods, it was the practice that the depreciation of the molds be treated, as it usually is in manufacturing, as a factory overhead. Yet, each mold could be used only for the production of the given product for which it was designed.

It happened that the depreciation expense of the molds, which were short-lived items, was a substantial one. Being consulted at the time the cost-control procedures of this company were being reorganized, the authors advised that the depreciation of the molds be considered as a variable direct cost and charged to each product. This was done independently from the *tax* considerations and requirements which often complicate the accounting procedure. An over-and-under absorbed mold depreciation account was opened which is debited if a given mold is scrapped before being fully depreciated and credited if a mold is still in use after the normal depreciation period (three years). Molds in this business are very expensive items. As a rule, they do not wear out before the products have to be redesigned to meet the changing taste of the public. Economic obsolescence is more the controlling factor than is mechanical depreciation. The decision for producing a given new product, which requires an expensive new mold, is therefore an important one, involving a substantial risk. In fact, a high-ranking executive of this business, considered as having the "feel" of the market, is responsible for the decision.

In the new accounting set-up, a double purpose was served. First, by assigning the depreciation of the mold to the product as a direct cost, a better control of the sales mixture was obtained. Second, the over-and-under absorbed mold depreciation account provided the yardstick by which the ability and foresight of the executive responsible for mold expense can be measured.

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In this case, as in most cases, the overhead expense converted in direct cost for the purpose of controlling the sales mixture was a factory-overhead expense. The reader may, in some instances, find it desirable to treat some selling or administrative expense as a direct cost. For example, if an advertising campaign is started for a given product or if a high-ranking executive is hired because of his particular skill exclusively related to one of numerous lines of production, it may well be found desirable, so far as sales-mixture determination is concerned, to treat such costs as direct costs rather than as selling or administrative overhead.

As a result of such an analysis of costs, it is thus possible to determine the direct cost to be assigned to a given product, which as a rule will include:

a. The direct-material and direct-labor cost, the total of which is often called the prime cost of the product.

b. All the other costs, generally considered as overhead, that (1) are found to be directly caused by the product, (2) are sufficiently substantial, and (3) the segregation of which is considered as practical.

The sum of these various elements will provide the budgeter with a reliable estimate of the direct cost of each product. The *direct profit*, which is the difference between the selling price (or the average selling price in case of multi-pricing) and the direct cost, is then computed.

It is this direct profit, usually given as a percent of the sales dollar, that will be used as a basis for establishing the sales-mixture control. Unlike the gross profit made on an item which includes a portion of the burden, and therefore varies with the sales mixture, the *direct profit* made on an item is a stable notion. It is not, as is the gross profit, dependent on the sales mixture, which it precisely purports to control.

In addition, the notion of direct profit, precisely because it does take in account only the costs that can reasonably be assigned to a product, is in accordance with the very purpose of the sales-mixture control. This purpose, in the final analysis, is to serve as a means of controlling the net profit made by the business. Any expense that does not increase or decrease substantially when the sales mixture changes does not need to be included in the sales-mixture control, because it does not influence the net profit of the business in relation to the sales-mixture changes. At the same time, any expense that increases or decreases substantially when the sales mixture changes should be included in such a control, because the control of the sales mixture will in such a case influence the amount of net profit.

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B. CLASSIFICATION OF SALES ON THE BASIS OF DIRECT  
PROFITS ON EACH CLASS OF PRODUCTS

The direct profit to be expected on each product being determined within a reasonable limit of accuracy, the products may then be classified on such a basis.

Thus appears the need for a new classification of the products. Before going any further, it is advisable to show how this new classification fits into the whole pattern of budgetary control.

Controlling begins with comparing an actual performance to a yardstick conveniently chosen as a reference. Effective control implies frequent and careful comparison. The growing complexity of modern business seems at first to be an insuperable obstacle to effective control. If a business manufactures and sells an average of 50,000 or 1,000 or even 500 different products during the year, how can the production, the inventory, the sales of each product be effectively budgeted and controlled year by year, month by month, week by week, and in some cases, day by day?

The answer to this question lies in a full understanding of the technique of classification to which occasional references have already been made. (See pages 55, 75.)

Every classification is, in some respect, imperfect and arbitrary. None is universal. Each one that serves a definite and useful purpose is justified.

For practical reasons, the total number of classifications used should be reduced to a minimum. The different classifications should be, if at all possible, coordinated and combined, and those that are so refined that their use costs more than they can possibly save through improved control, should be avoided.

Yet, multiple classifications are sometimes necessary.

The purpose of a classification, in managerial control, is to substitute group control for unit control, thereby reducing the number of comparisons required. It is not possible to compare every day or every week the actual sales of 5,000 different products by 75 sales districts and 625 salesmen with the detailed budgeted sales. By grouping sales in broad categories, the complexity of control is reduced to the number of groups: practically 3 or 5, or 20 groups at most.

Groups for which the actual performance is satisfactory do not require further investigation. Groups for which actual performance is substantially below standard are investigated, subgroup after subgroup.

This secondary investigation will in turn concentrate on the subgroups that are themselves below standard, etc., etc.

This technique of selective control is somehow comparable to the one applied in an automatic telephone switchboard. The impulse given by the dial puts the connecting rod on the desired spots, selection after selection. The classification system, if properly designed, puts the finger of the controller on the unsatisfactory performance, selection after selection. In both cases the selection proceeds from the group to the unit by elimination of subgroups.

The risk involved in the construction and operation of an automatic telephone switchboard is the mixing up of the wires. In business control, the risk is an improper coordination of the various classifications.

Returning now to the sales-mixture control, it was found that the basis of such a control is the direct profit made on each product. This implies that, if there are many products, the classification for the purpose of sales-mixture control should be on the basis of the direct profit. Each group should include the products on which a comparable direct profit is made by the business. The range of variation within each group will be determined according to the circumstances and the needs of the business. It will also depend on the total range of variation of direct profit, from the most profitable to the less profitable item. The solution recommended in an actual case is shown hereunder.

The classification based on the direct profit, product by product, should be coordinated with the other classifications required for other purposes.

The coordination implies a choice, it being a good rule that wherever possible the various classifications should be "within each other" rather than at the same level. For example, it was found that for sales forecasting purposes the products should sometimes be classified according to their economic sensitivity. (See page 55.) Now if, in a business where such a classification is deemed desirable, it is also found that the range of direct profit between the most and least profitable items is such that the sales mixture requires careful control, it will be necessary to have also a classification of products according to their profitability (direct profit).

It would not be advisable to have both classifications placed at the same level and functioning independently. One of them should be given the prominence, the other one functioning "within" the first one. For instance, in such a business, each basic group composed of products having the same economic sensitivity for sales forecasting purpose (see page 55) will be subdivided into subgroups showing substantially the

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same profitability (direct profit). This will avoid the risk of confusion among groups belonging to different classifications.

#### C. THE SALES-MIXTURE CHART. ACTUAL CASE.

In fact, the control of the sales mixture, as soon as there is a substantial number of products, may become very complex, especially if the range of variation in direct profit is a wide one.

Yet, to be meaningful, the control of the sales mixture must detect unsatisfactory conditions as soon as they begin to develop. This is to say that it must be exercised at very frequent intervals: month by month at least, if not week by week. Furthermore, if the distribution is done on a wide market, it must be exercised district by district.

The writers have found that such a control is greatly facilitated by the use of a graphical representation which they have termed the "sales-mixture chart." This chart and its use will be described by using an actual case, to which a reference was already made earlier in this chapter.

This case is that of a business manufacturing and selling about 250 different products. All these products having about the same economic sensitivity, no classification like the one described on page 55 was needed.

The analysis of the direct profit made on each product revealed that the range of variations extended from slightly more than 20 cents to a little less than 85 cents on the sales dollar. (In fact, the company sells at three different prices: wholesale, retail, and export price. A standard selling price was adopted for each product for the purpose of sales control.)

It was decided to classify the products into 12 groups, numbered 1 to 12, according to the direct profit made on each dollar of sales.

The actual sales of each group of products during the year 1948, expressed in percent of total sales, were as shown in Table XIV.

These data were plotted as in Figure 32. The twelve groups are in abscissa (represented on the chart by their average direct profit). Their size, expressed in percent of total sales, is plotted in ordinate. The thick curve was fitted to the thin broken line.

Figure 32 is a sales-mixture chart. The thick curve is the sales-mixture curve for the year 1948.

The sales mixture for 1948 was considered as an acceptable standard and it was considered to control the 1949 mixture by comparing it to the 1948 one.

The sales-mixture chart in Figure 32 was mimeographed. Each week

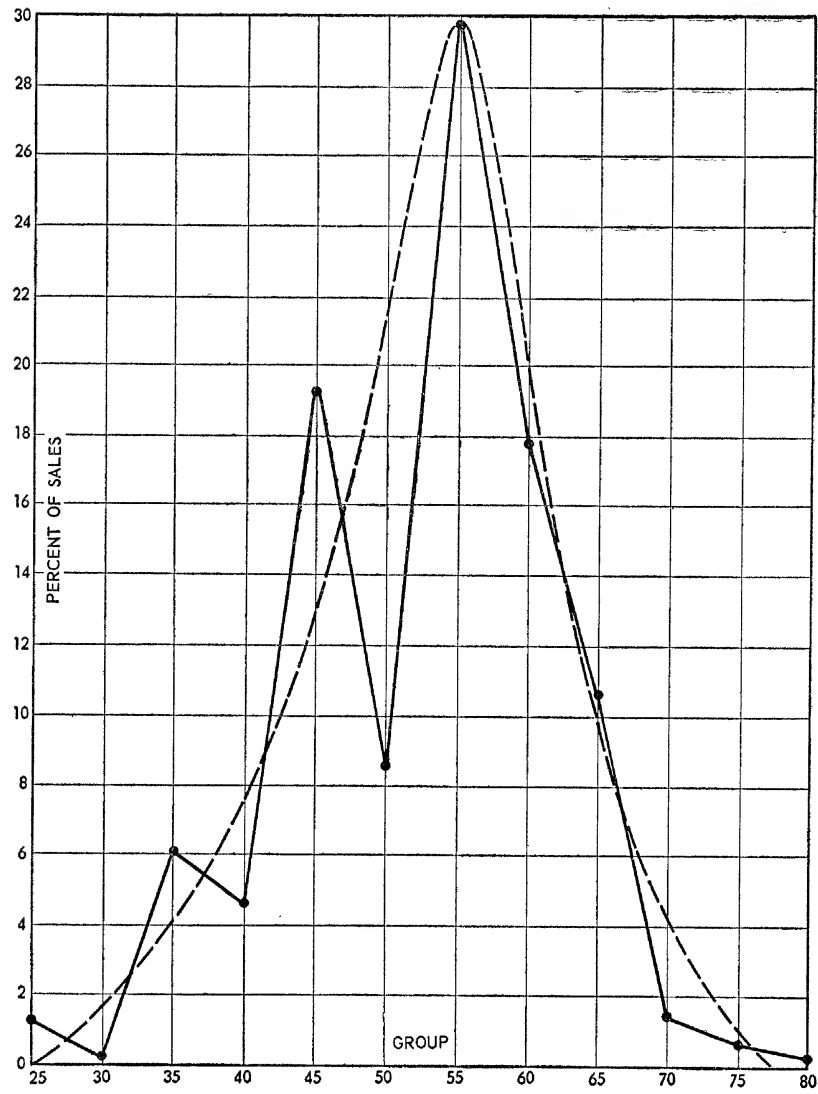


Figure 32. Sales-Mixture Chart



the actual weekly sales are computed, group by group, in percent of the total weekly sales, both for the current week and cumulative from January 1, 1949.

TABLE XIV  
SALES MIXTURE—YEAR 1948

<i>Group Number</i>	<i>Average Direct Profit for the Group (Percent of sale dollar)</i>	<i>Percentage of Total Sales</i>
1	80	.33
2	75	.72
3	70	1.39
4	65	10.52
5	60	17.61
6	55	27.71
7	50	8.62
8	45	19.10
9	40	4.60
10	35	5.95
11	30	.10
12	25	1.35
TOTAL		100.00

The data are plotted on the mimeographed sales-mixture chart and a 1949 sales-mixture curve fitted to the data.

A 1949 curve more skewed to the left than the 1948 indicates a higher proportion of less profitable sales. The opposite is true if the 1949 curve is more skewed to the right. If the skewness is approximately unchanged, or if it is a favorable one, no action is taken. If the new sales mixture is unfavorable, management's attention is called to the situation and it may, at its choice, take an appropriate action.

#### D. BREAK-EVEN CHART. BASIC EXPENSE TREND.

In fact, a change in the sales mixture may be unavoidable. The duty of the budgeter's or of the controller's office is simply to show management the consequences of an unfavorable mixture.

In the above case, it was found convenient to use a break-even chart <sup>1</sup> to show management the consequences of a possible change in the sales mixture.

<sup>1</sup> It is assumed that the reader is familiar with the construction and properties of the break-even chart. For further information on the subject, *Eco. Ind. Mgmt.* IV, 104 et seq.

TABLE XV  
1949 ESTIMATES

Sales expense		1,000.00
Variable	659.17	
Regulated	88.67	
Fixed	73.92	
Total expense		<u>821.76</u>
Net operating profit		<u>178.24</u>

An estimate of the 1949 expense for the anticipated volume of sales gave the results shown in Table XV. (At the request of the company, the estimate is given in one-thousandth of sales instead of actual figures.)

The data given in Table XV are the basis of the break-even chart shown in Figure 33. This break-even chart gives the budgeted sales-expense relationship for the year 1949, as forecasted at the end of 1948.

This relationship is based on a given sales mixture. It would change with the sales mixture because the ratio of total expense to total sales does vary with the sales mixture. The sales mixture on which the break-even chart in Figure 33 is based is the 1948 mixture considered as standard. Should the 1949 mixture prove to be less favorable than the 1948 one, for instance, this fact would be revealed by the sales-mixture curve being more skewed to the left. What would the new break-even chart be in such a case? Where would the new break-even point be?

The answer to the questions can be given by the use of the *basic expense trend* of the break-even chart.

The basic expense trend is the trend of the non-direct expenses in relation to sales. It is obtained by deducting all the direct costs (as defined on page 158) from the total costs. The direct costs in this case, as it will be in most cases, were all variable ones. The constant expense (fixed and regulated) is therefore the same for the basic trend that it is for the trend of total expense. The variable expense of the basic trend, on the contrary, as compared to that of the original trend is reduced by an amount equal to the total direct costs for the period.

The total direct cost, being the sum of the direct costs on each product, will indeed vary with the mixture. So does the trend of total expense shown in Figure 33. The basic trend of expense, on the contrary, is independent from the mixture.

In the above example, the direct cost for each of the 12 groups of products was as shown in Table XVI. The amounts are expressed in 1/1000 of total sales.

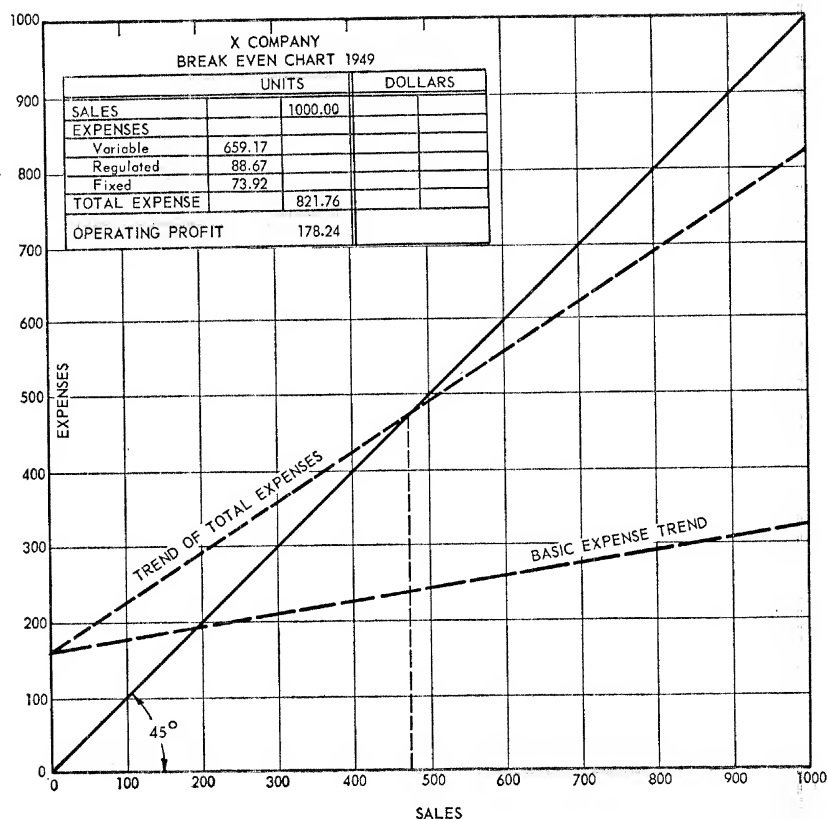


Figure 33. The Basic Expense Trend of the Break-Even Chart

Adding all these group direct costs gives a total of  $\frac{490.2}{1,000}$  of sales. This total is the estimate of the 1949 direct costs, based on the 1948 sales mixture.

Deducting it from the estimated total variable expense of 659.17 (see Table XV) leaves a difference of

$$659.17 - 490.2 = 168.97$$

The basic variable expense for the year 1949 is therefore estimated at  $\frac{168.97}{1,000}$  of sales.

This figure is used for plotting the basic expense trend as shown in Figure 33. The basic trend is defined by its zero ordinate, equal to the

fixed and regulated expense:  $88.67 + 73.92 = 162.49$ ; and its ordinate of  $168.97 + 162.49 = 331.46$  at the point of abscissa 1,000

The actual control of the sales mixture and the measurement of consequences of change in sales mixture are made as follows:

Every week, the sales mixture for the week and for the period since the beginning of the year is plotted on a chart of the type shown in Figure 32. If the plotting reveals that the new curve of the sales mixture for the period (or for the week, depending on the conditions of operations) is substantially more skewed to the left than the 1948 curve, it may be said that the sales mixture is substantially below the 1948 mixture chosen as standard.

TABLE XVI

## DIRECT COSTS OF THE SALES MIXTURE

<i>Group Number</i>	<i>Direct Cost (in 1/1000 of sales)</i>
1	.8
2	1.9
3	4.5
4	38.0
5	74.1
6	139.5
7	44.5
8	109.1
9	28.2
10	39.3
11	.7
12	.96
Total	410.26

In such a case, a precise measurement of the sales mixture from the point of view of its profitability is required. The total direct cost of the mixture actually sold, the "new mixture," is computed. This total added to the total cost of the basic trend (in this example  $\frac{331.46}{1,000}$ ) gives the total expense based on the "new mixture."

To illustrate, let us go back to the previous example. Let us say that, at a given time, the curve of the sales-mixture chart appears substantially more skewed to the left than the standard mixture curve and that the direct cost of the new mixture actually sold, when computed, is found to be  $\frac{598.54}{1,000}$  of sales.

The standard mixture's direct costs were estimated for 1949 at  $\frac{490.2}{1,000}$  of sales.

But the actual mixture's direct costs are  $\frac{598.54}{1,000}$  of sales.

The new trend of total expense, based on the new mixture actually sold, is obtained by adding to the basic trend the additional variable expense resulting from such a direct cost of  $\frac{598.54}{1,000}$  of sales.

The new trend's zero ordinate is the same as the basic trend's zero ordinate as the direct constant expense is zero. The ordinate of the new trend, for the abscissa 1,000, is equal to the basic trend's ordinate for the same abscissa, plus the direct cost, which is:

$$331.46 + 598.54 = 930.00$$

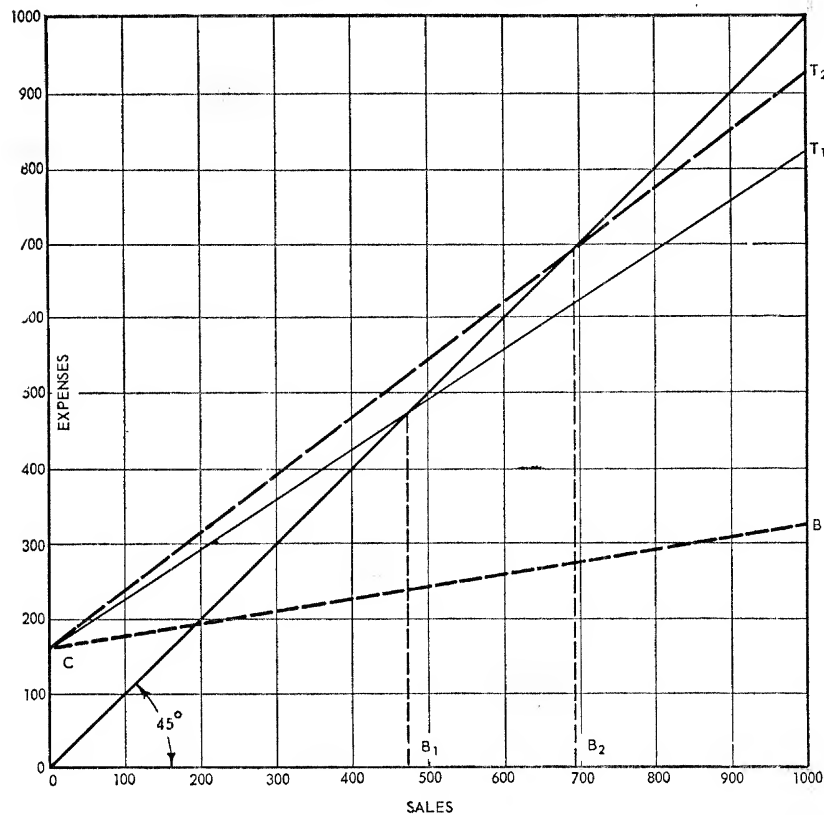


Figure 34. The Break-Even Point with Different Sales Mixtures

Figure 34 shows the original trend of total expense ( $CT_1$ ) based on the sales mixture of 1948, the basic expense trend (CB) and the actual trend of total expense based on the latest sales mixture sold ( $CT_2$ ).

It is seen that, if the original sales mixture had been maintained, the business could break even at  $\frac{475}{1,000}$  of sales. (Abscissa of  $B_1$ .) With the new, less favorable mixture, the business requires  $\frac{690}{1,000}$  of sales to break even. (Abscissa of  $B_2$ .)

For the same volume of sales (1,000) the net profit to be expected with the standard 1948 sales mixture (direct cost 490.26) was

$$P_1 = 1,000 - (331.46 + 490.26) = 178.28$$

while the net profit with the actual mixture sold would only be

$$P_2 = 1,000 - (331.46 + 598.54) = 70$$

In both cases the basic expense is the same (331.46) while the direct expense is higher with the actual mixture than with the standard one.

The control of the sales mixture enables management to be kept informed week by week of the changes in the break-even point and in the probability of profit in relation to changes in the sales mixture.

#### E. CONTROL OF THE SALES MIXTURE THROUGH COST OF SALES BUDGETING

An alternate means of control of the sales mixture is the use of cost of sales budgeting.

In such a case, actual cost of sales (at standard cost) is being controlled by comparison with budgeted cost of sales (also at standard cost). At the same time, actual sales are compared with budgeted sales.

The control of the sales mixtures under different situations proceeds as illustrated by the following remarks.

##### I. Actual sales = budgeted sales

##### 1. Actual cost of sales = budgeted cost of sales.

Mixture is as expected.

##### 2. Actual cost of sales < budgeted cost of sales.

More profitable items sold than expected.

Sales mixture is better than expected.

##### 3. Actual cost of sales > budgeted cost of sales.

Sales mixture is not as good as expected. Although the sales budget is met, the result is not as expected. The profit will be less than expected and may even become a loss.

II. Actual sales  $>$  budgeted sales

4. Actual cost of sales = budgeted cost of sales.

Sales mixture is better than expected.

5. Actual cost of sales
- $<$
- budgeted cost of sales.

Sales mixture is better than expected.

6. Actual cost of sales
- $>$
- budgeted cost of sales.

A more precise investigation is required. The ratio of increase in sales is to be compared to the ratio of increase in cost of sales.

III. Actual sales  $<$  budgeted sales

7. Actual cost of sales = budgeted cost of sales.

Sales mixture is not as good as expected.

8. Actual cost of sales
- $>$
- budgeted cost of sales.

Sales mixture is not as good as expected.

9. Actual cost of sales
- $<$
- budgeted cost of sales.

A more precise investigation is required. The ratio of reduction in sales is to be compared to the ratio of reduction in cost of sales.

The use of a graph will greatly simplify control. An actual example of sales-mixture control based on cost of sales budgeting showing the use of appropriate graphs for such a purpose is given in Appendix C.

## II. TOTAL SALES CONTROL

The obvious purpose of total sales control in a budgeted business is to show whether actual sales are or are not up to the standard, namely, the budgeted sales.

A less obvious but quite as important purpose is to determine where a discrepancy, if any, may come from, so that appropriate action may be taken.

The procedures by which total sales are controlled should therefore be designed so as to show management where and when any discrepancy occurred between actual and budgeted sales. The warning signal should be sounded in time to enable management to take effective action. Depending on the kind of business, the control will be exercised for the business as a whole or branch by branch, district by district, or even salesman by salesman. Also depending on the nature of the business, the control will be a monthly, weekly, or daily one. It may even be a preventive control: whenever possible, orders control should be a preliminary step towards sales control.

The various processes and procedures of total sales control will now be studied.

A. TERRITORIAL DIVISION AND BRANCH, SALES  
AND EXPENSE CONTROL

The budgeting of territorial division and branch operations as to both sales and expenses, and the control of expenses in relation to sales, must be based on a detailed analysis of the economic characteristics of the marketing activities peculiar to each division and branch. Each division and branch must be treated as a business standing on its own feet, and the manager of each division and branch held accountable for expense control in relation to sales. The procedure for setting up a system of division and branch budgets will be illustrated by an example from the experience of the authors, and briefly stated in the preceding chapter. In order not to burden the record the territorial divisions only will be considered. The case is simplified by the fact that the company to which this example refers manufactures a food product sold by the pound to the grocery and bakery trade. It is a uni-product business. The data taken from the company's records are reduced to round numbers to facilitate easy reading.

For the particular year chosen for illustration the total annual sales and major expense items were budgeted as follows:

	<i>Dollars</i>
Annual sales	5,000,000
Annual cost of manufacturing and general administration	2,400,000
Difference	2,600,000
Estimated profit from operations	600,000
Allowed for selling and distributing expenses	2,000,000

This statement means that the sales organization of the company is allowed \$2,000,000 to produce \$5,000,000 sales or is budgeted 40¢ for each dollar of the sales *anticipated*. The sales territory is divided into four divisions with several branches under the supervision of each division office. The sales and distribution budget is divided into four principal categories as follows:

<i>Item</i>	<i>Total Amount</i>	<i>¢/\$ Income</i>
General office expenses	\$ 165,000	3.3
Division office expenses	275,000	5.5
Branch office expenses	1,180,000	23.6
Freight and express	380,000	7.6
Totals	\$2,000,000	40.0

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The operations of all the branches together absorb 23.6¢ of every dollar of income from sales and is the largest single item in the sales and distribution budget. But the average for the whole of both division office expense and branch expense is not applicable to each division nor to each branch. The sales budgets for each division are not the same and hence the organizations in each case for supporting sales are different.

For example, the annual sales budget for each division and the corresponding expenses budgeted were as follows:

Division Offices					
<i>Item</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>Totals</i>
Annual sales	\$1,540,000	870,000	740,000	1,850,000	5,000,000
Annual expenses	80,000	52,000	43,000	100,000	275,000
Expenses per \$ sales	5.2¢	6.0¢	5.8¢	5.4¢	5.5¢

The branches under each division had the following expense budgets for the total annual sales as indicated:

Total Branch Annual Expense Budgets by Divisions				
<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>Total</i>
\$320,000	230,000	210,000	420,000	1,180,000
Cents per dollar of sales				
20.8	26.4	28.3	22.7	23.6

The freight and express\* budgets for each division for total annual sales were:

Total Annual Freight and Express Budget by Divisions				
<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>Total</i>
75,500	114,000	52,500	138,000	380,000
Cents per dollar of sales				
5.0	13.0	7.0	7.5	7.6

The B division was far removed from the point of manufacture and hence its freight and express costs were considerably higher.

\* This item covers the cost of delivering the product from the factory to each branch.

The total annual Direct Division expenses, including their handling and freight and express charges, are:

Total Annual Direct Division Expenses

	DIVISION				
<i>Item</i>	A	B	C	D	<i>Totals</i>
Division Office	80,000	52,000	43,000	100,000	275,000
Branches	320,000	230,000	210,000	420,000	1,180,000
Freight & express	75,500	114,000	52,500	138,000	380,000
Totals	475,500	396,000	305,500	658,000	1,835,000

If each division is scheduled to carry its proportion of the general sales office expense according to the proportion of its sales to total sales then the additional expenses assessed to each division are:

Assessed General Sales Office Expenses

	DIVISION				
	A	B	C	D	<i>Total</i>
	\$51,000	\$28,000	\$25,000	\$61,000	\$165,000

Accordingly, for anticipated annual sales of \$5,000,000, the expense budgets of each division, including the assessed general sales office expense, are:

Total Division Expense Budgets for Annual Sales of \$5,000,000

	DIVISION				
	A	B	C	D	<i>Total</i>
	\$526,500	\$424,000	\$330,500	\$719,000	\$2,000,000

*Variation of Division Expenses with Sales*

An analysis of the character of the expenses of each division in terms of constant and variable items showed that these for each division and the corresponding sales quotas are as follows:

## DIVISIONS

Item	A	B	C	D
Constant	\$384,000	\$264,000	\$250,000	\$520,000
Variable	142,500	160,000	80,500	199,000
Sales	1,540,000	870,000	740,000	1,850,000

Thus the trends of annual expense in relation to annual sales are:

*Annual Expense Trends*

Division A
$\$384,000 + 9.25\% \text{ sales}$
Division B
$\$264,000 + 18.4\% \text{ sales}$
Division C
$\$250,000 + 10.87\% \text{ sales}$
Division D
$\$520,000 + 10.75\% \text{ sales}$

Since a comparison of the monthly actual expense of each division with the budgeted trend is necessary for control purposes, the above annual trends are reduced to monthly trends which are as follows:

*Monthly Expense Trends*

Division A
$\$32,000 + 9.25\% \text{ sales}$
Division B
$\$22,000 + 18.4\% \text{ sales}$
Division C
$\$20,933 + 10.87\% \text{ sales}$
Division D
$\$43,333 + 10.75\% \text{ sales}$

Thus, should Division A report sales of \$100,000 for any given month and expenses of \$44,000, including assessed general sales office expenses, it is found that, since according to the trend the expenses should be  $\$32,000 + \$9,250 = \$41,250$ , the division has spent \$2,750 more than its budgeted allowance. The particulars of the actual monthly expenditures classified into constant and variable categories may then be com-

pared with their respective budgeted amounts to find items from which the variance is derived.

### *The Break-Even Sales Quota*

The sales required of each division for the business as a whole to break even consists of two parts:

1. Sales required for the division to absorb its expenses.
2. Additional sales to carry the expenses of manufacture and administration at their break-even point.

The Division expense break-even sales are readily found from their equations of expense trend and are:

#### Division A

$$\text{Monthly expense B.E.} = \frac{\$32,000}{1 - .0925} = \$ 34,600$$

#### Division B

$$\text{Monthly expense B.E.} = \frac{\$22,000}{1 - .184} = \$ 27,000$$

#### Division C

$$\text{Monthly expense B.E.} = \frac{\$20,933}{1 - .1087} = \$ 23,400$$

#### Division D

$$\text{Monthly expense B.E.} = \frac{\$43,333}{1 - .1075} = \$ 48,500$$

Total	\$133,500
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An analysis of the annual costs of manufacture and administration, which total \$2,400,000, reveals the facts that \$1,200,000 is constant and \$1,200,000 is the variable total cost for sales of \$5,000,000. Accordingly, the annual constant total costs of the business as a whole are:

Manufacturing & administration	\$1,200,000
Divisions	1,418,000
Total	\$2,618,000

The annual variable total costs for the business as a whole for annual sales of \$5,000,000 are:

Manufacturing & administration	\$1,200,000
Divisions	582,000
Total	\$1,782,000

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The annual break-even point for the business as a whole is therefore:

$$\text{Annual B.E.} = \frac{\$2,618,000}{1 - \frac{782}{5,000}}$$

$$\text{B.E.} = \$3,090,000$$

The monthly break-even point for the business as a whole is

$$\frac{\$3,090,000}{12} = \$257,000$$

The divisions altogether must have total sales of \$133,500 per month for each to break even. The difference between \$257,000, the monthly break-even point for the business as a whole, and \$133,500 is \$123,500. This additional amount of monthly sales over the break-even totals of the divisions must of course come from the divisions. It appears appropriate that this additional amount (\$123,500) should be allocations to the divisions according to their relative sales budgets. Accordingly the additional sales to be allocated to each division are:

Division A, 31%	= \$38,300
Division B, 17%	= 21,100
Division C, 15%	= 18,100
Division D, 37%	= 46,000
Total	<u>\$123,500</u>

The total monthly sales required of each division for the *business as a whole* to break even are:

Division A	= \$34,600 + \$38,300	= \$ 72,900
Division B	= 27,000 + 21,100	= 48,100
Division C	= 23,400 + 18,100	= 41,500
Division D	= 48,500 + 46,000	= 94,500
Total		<u>\$257,000</u>

#### Monthly Sales

The average monthly sales as budgeted above were then modified for season variation, since the business was more active in the fall and winter months than in the spring and summer. The monthly variations in sales were the same in each division. The percent of annual sales for each month of the year was approximately as follows:

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*Percent of Annual Sales*

<i>Month</i>	<i>Percent</i>
January	10.0
February	9.6
March	9.2
April	8.2
May	7.3
June	7.3
July	7.0
August	7.3
September	7.6
October	8.3
November	8.8
December	9.4
Total	100.0

Taking Division A for the month of July as a typical case, the budget of sales for that month would be 7.0% of \$1,540,000, or \$107,800.

The total division expense allowed for these sales are:

$$\text{Expense} = \$32,000 + 9.25 \text{ sales}$$

$$= \$42,000 \text{ approximately}$$

Of this expense, the constant portion is \$32,000 and that allowed for variable expenses is approximately \$10,000. But of the \$32,000 of constant expense carried by the division, \$4,250 is assessed General Office Expense and the remainder is incurred by the division offices and the branches under the division. The division manager is therefore accountable for \$27,750 of the constant expenses and \$10,000 of the variable expenses. These over-all expenses are then broken down by classified items, with the budgeted amounts for each item given and a column for recording the actual expenditures under each item provided for comparison. This schedule should be prepared by the company auditor and forwarded each month to the division manager. The division manager then reports to the general sales manager on the significant variances, if any. The same procedure is followed for each branch and the branch manager reports on variances to his division manager.

This general outline of the steps taken for setting up the expense-sales budgets of the divisions of a business is indicative of the way in which such budgets may be prepared and administered for establishing and maintaining rational control of expense-sales relationships.

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## B. ORDERS VS. SALES

In many businesses orders precede sales by a substantial length of time. In most cases, it will be found that the lag in time between orders and sales is relatively constant for a given class of product. It is therefore possible to determine, sometimes in advance and on the basis of the orders received, whether or not the sales budget has a good chance to be met.

Whenever possible, the sales manager will establish his own budget of orders received. It is the schedule of the orders that are to be in at a given time if the sales budget is to be fulfilled.

## C. SALESMEN CONTROL

The budget of orders received will provide the tool the sales manager needs to control the salesmen's activity.

Usually, each salesman is assigned a certain sales quota. The total of all salesmen's quotas is equal to the sales budget.

The sales manager, and also the president and other high-ranking executives, will generally want to follow closely the performance of the salesmen in relation to their quota. To facilitate such a control, the sales quota of each salesman should be translated in terms of orders-received quota, to which the actual orders received can be compared month by month, week by week, or even day by day.

It will often occur that such a reconciliation between sales and orders is made difficult by irregularity in the seasonal pattern of the orders received. For instance, in the toy industry, there is a distinct sales seasonal pattern. About 65 percent of the production is sold in the retail stores at Christmas time, corresponding to shipment (or "sales") by the manufacturers during the months of October and November. There does not seem, however, to be throughout the years a definite seasonal pattern of orders received that would make it possible to reconcile the sales budget (shipments) with the orders received.

In such cases, not only is management unable to exercise a preventive sales control; it is also in a difficult position to measure the value of a given salesman's performance.

Salesmen's quota are expressed in terms of sales, i.e. shipment. How can the salesmen's performance, i.e. the orders received, be compared to a standard if there is no order budget?

The authors have found it convenient in such a case to check each salesman's performance by comparing it to the other salesmen's performances in relation to their respective sales quotas. The use of graphs

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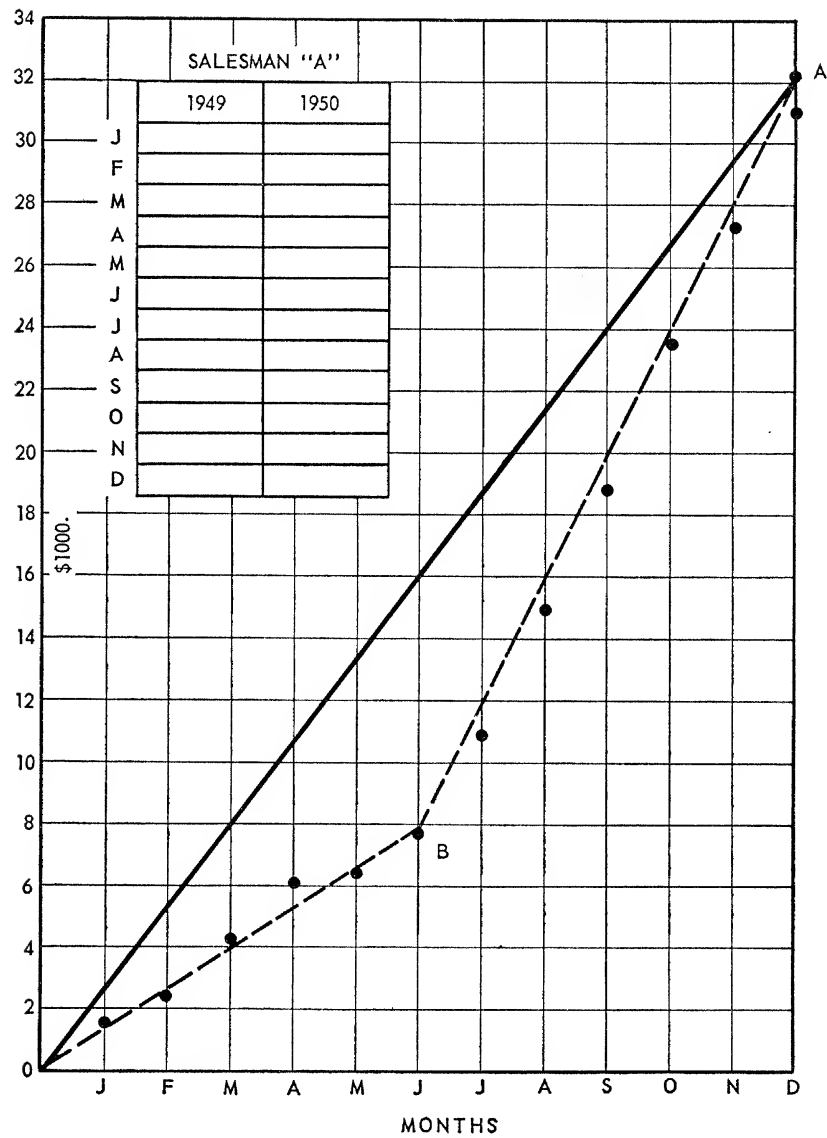


Figure 35. Salesman's Control Chart (Actual Sales)



greatly facilitates such comparisons as will be shown by the following example.

### *Individual Salesman's Quota*

In many businesses, particularly those which experience seasonal variations in sales, it is not only required to establish the quota of annual orders required of each salesman but also the seasonal quota. By this means management has a more realistic pattern of monthly anticipations of orders and a better means for judging the salesman's performance week by week and month by month. In a certain business with which the authors are associated, it is found that some of the company's products are ordered largely in the last six months of the year. In fact, only about 25 percent of the annual sales are ordered in the first six months of the year.

Accordingly, after establishing the annual sales quota for each salesman, the performance with reference to the quota is judged on the basis of the trends in sales experienced by the salesman during the current year. For example, Mr. A during the current year had a sales quota of \$300,000, and a record of orders booked of approximately \$80,000 at a uniform monthly rate from January 1 to June 30, and from July to October an average monthly rate of about \$36,000. Based upon this pattern of orders booked, and a sales quota of \$325,000 for the coming year (accepted by Mr. A as a possibility), the budget of sales for the coming year is graphed as shown in Figure 35. The base of the chart is the month of the year. The point A is the annual sales quota. The line O - B is the trend line of sales for the months of January to June while the line B - A is the trend for the period from June to December. The recorded points show the actual orders booked cumulative. Sometimes it is useful to record on the chart the actual sales for each month for the past and current years. The advantage of the chart is that there is shown at a glance the *trend* in actual sales compared with both last year's trend and the budgeted trend. The trends and comparisons are not readily discerned in tabular statements. With such charts for each salesman, kept by months or by weeks as the nature of the business demands, the sales manager can visualize the status and trend of each salesman's performance and take such steps as are appropriate to each as departures from the trend appear. Another salesman's control chart is the one shown in Figure 36, which has the advantage over the one shown in Figure 35 in that the differences in performance as compared to the quota are more clearly discerned. In this chart the monthly sales, or weekly sales if advisable, *above or below the quota of last year*, are

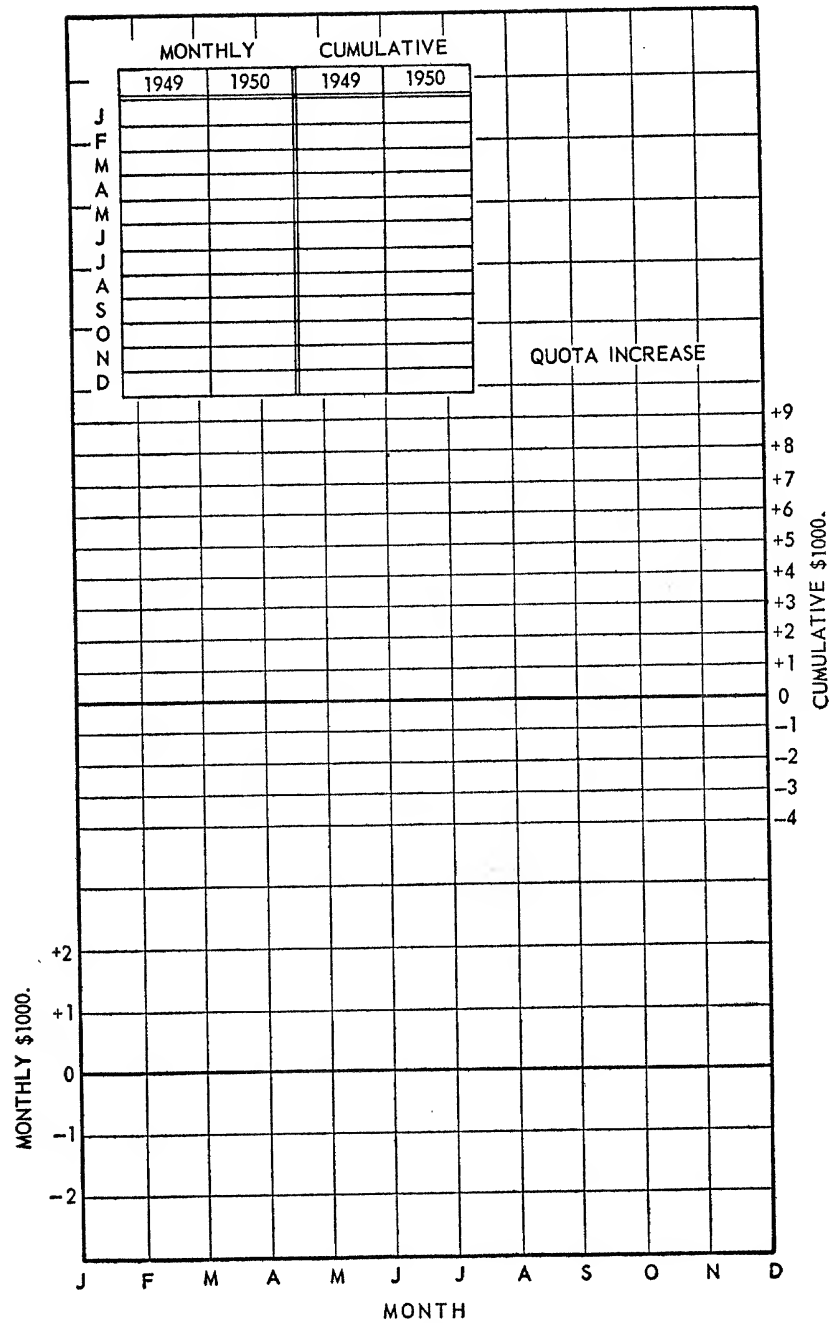


Figure 36. Salesman's Control Chart (Sales Differential)

plotted on the lower part of the chart, and the cumulative sales up to any month above or below the quota of last year are plotted on the upper part of the chart. If the increase in the quota is \$9,000 for the year, as shown in Figure 36, the relation of the cumulative difference in sales to the increase in quota is immediately apparent by its relation to an oblique line originating at zero in January and terminating at \$9,000 in December.

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## THE CONTROL AND ADJUSTMENT OF EXPENSES

**T**HE CONTROL and adjustment of the expenses of manufacturing and marketing the product, as well as administering the affairs of the business, should be based on the following considerations.

The adoption of a budget should never result in standardization to the point where appropriate adjustments and changes are not possible. Industry is always in a state of flux in the sense that new methods and means of operation in production and marketing are frequently developed and adopted during the year, and any company in any given industry should adapt itself to new conditions as they appear, and adjust its budget accordingly.

Nor is the budget something that is only a matter of record in the office. The budget, if it is to be effective as a standard of measurement and a tool for control, must be used in all executive offices as a "yardstick," to discover variations of expenses from what they should be, and to determine the particulars which give rise to the variations.

Budgetary control is based on "what should be" and operates to determine "why it was not as should be." It also serves as a means for showing the economic particulars of "what can be" in cases of changes in methods of manufacture, in prices of raw materials, and in wage rates, to mention a few.

A budget is a forecast based on estimates. The budgets of expense for each division of the business rest on estimates of wage rates, prices for materials and supplies, and other unit costs. As these rates, prices, and unit costs change during the year, the expenses on which they are based will also change. The departure of sales and of income from their estimated amounts demand corresponding adjustments in the activities which are supported by them and hence in the expenses of such activities. The budget therefore is a dynamic and living process for the adjustment of activities and their associated expenses, much as the endocrine glands, with the nervous system, serve the biological organism to adjust its behavior to the changing condition of the environment.

The budget, while expressing a pattern of relationships between activities and expenses, does so in an algebraic as well as in an arithmetical sense. When one understands the algebra of budgeting he is in a position to make the specific adjustments which should follow from changes in prime factor values. Another matter that is important to understand is that, while there is a central office charged with the responsibility of *formulating* the budget of expenses of each division of operation of the business and of the business as a whole, the actual adjustment of operations and their related expenses cannot be centralized but must be made by those in daily contact with and responsible for operations and expenses. This does not imply that the superintendent of manufacture, for example, does not concern himself about the operations of the department of Foreman X. It does mean that Foreman X makes the needed adjustments while the superintendent of manufacture compares the reported results of X's department with the results anticipated.

The machinery of expense control and adjustment is decentralized responsibility and action at all levels of operation from the foreman to the president, within the framework of the algebra of the budget. For example, the president, acting on the information of the central budgeting office, makes the first adjustment of the budget of manufacture for June by ordering a 10 percent reduction of output for that month. The superintendent of manufacture translates this directive into programs of action for each department under his supervision. Each department foreman thereupon adjusts his activities accordingly, estimates from the

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algebra of his budget the changes in expenses resulting and attempts to control them within the limits estimated.

This means that the operation of *every* department of a business should be under budgetary control, and that the head of *each* department should be provided with budgets of expenditures anticipated for the department over which he presides. These budgets should be stated in such form and detail as may be required for guidance and control purposes. Since the budget must be "custom built" for each company, there are no general forms available for expressing the budget details which are applicable to all businesses. There are, however, certain procedures on which the control of budgetary expenses should be based and it is our purpose to state them and give a few examples of methods, forms, and graphs which were used by several companies to apply these procedures.

### CONTROL

The procedures are:

1. Every chief departmental officer of the company, from the president to the shop foreman, should be supplied with a budget of anticipated operations and related expenses pertaining to his department. and in the preparation of such budgets he has a part.
  2. Each departmental budget should be subdivided into groups appropriate to the divisions of operation of each department.
  3. The budget should be stated for the months and weeks of the years, as the nature and needs of operations may require.
  4. Whenever possible, each budget should be expressed in graphic as well as tabular form for purposes of visual comparisons, and be accompanied by a schedule of adjustments to be made when activities are modified by executive directives.
  5. Reports on performances in comparison with the budget should be made at designated periods (monthly, weekly, and sometimes daily) to the superior officer by each person in control of any part of the budget.
  6. Since successful budgetary control of expenses is determined by the degree of budget consciousness of each member of the company, from the president at the directors' table to the clerk at his desk and the workman at his machine, there should be periodic group discussions on variances of budgeted operations and expenses, by shop foremen, department heads, and executive officers.
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Each of the above procedures requires the preparation and use of tabular statements and graphs. A few of these prepared by the writers for different companies are submitted for illustration.

#### FOR THE BOARD OF DIRECTORS

The monthly reports of the president to the board of directors on operations and expenses in relation to the budget may contain the following graphs and tabular statements:

Charts showing total expenses and cost of manufacture in relation to sales for the current month and the preceding months of the budget period. A few such charts are shown in Figures 37, 38, 39, and 40. By the use of these graphs the directors can easily grasp the extent to which the major groups of expenses, as well as the gross profit and net profit, are being kept under control.

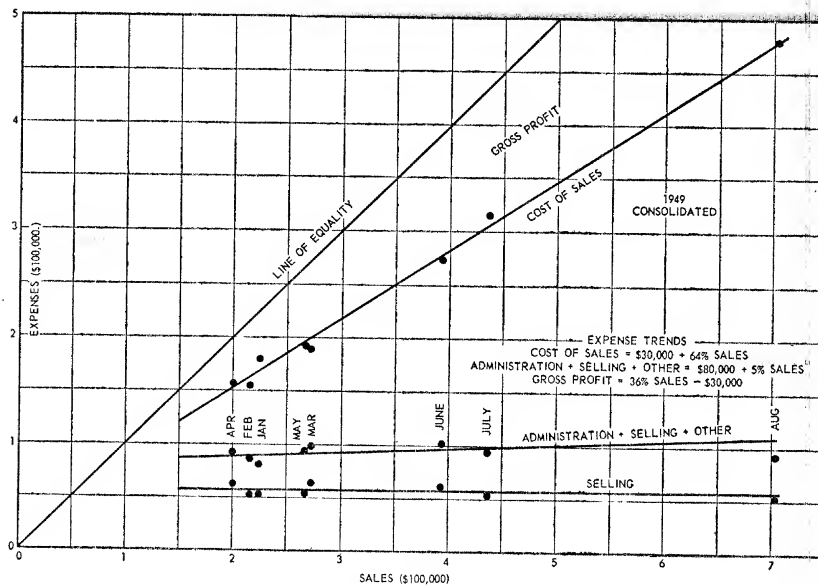


Figure 37. Monthly Profit-and-Loss Chart

Figure 37 is the monthly profit-and-loss chart of a company operating in a highly seasonal industry, showing the relations of cost of sales, administration and selling, and selling expenses to sales for each of the months from January to August 1949. The chart shows how closely these expenses were controlled in relation to the budgeted expense trends.

Figure 38 shows the results of operations in terms of the number of cents expense in relation to one dollar of sales. Figure 39 shows the break-even chart of Sales Branch No. 1 of the same company. The cost of sales trend goes through the origin because the branch purchase all products sold. All constant expenses were fixed (no regulated expenses). Figure 40 shows the costs of labor, materials, and burden (cost of sales) of one of the products of the company.

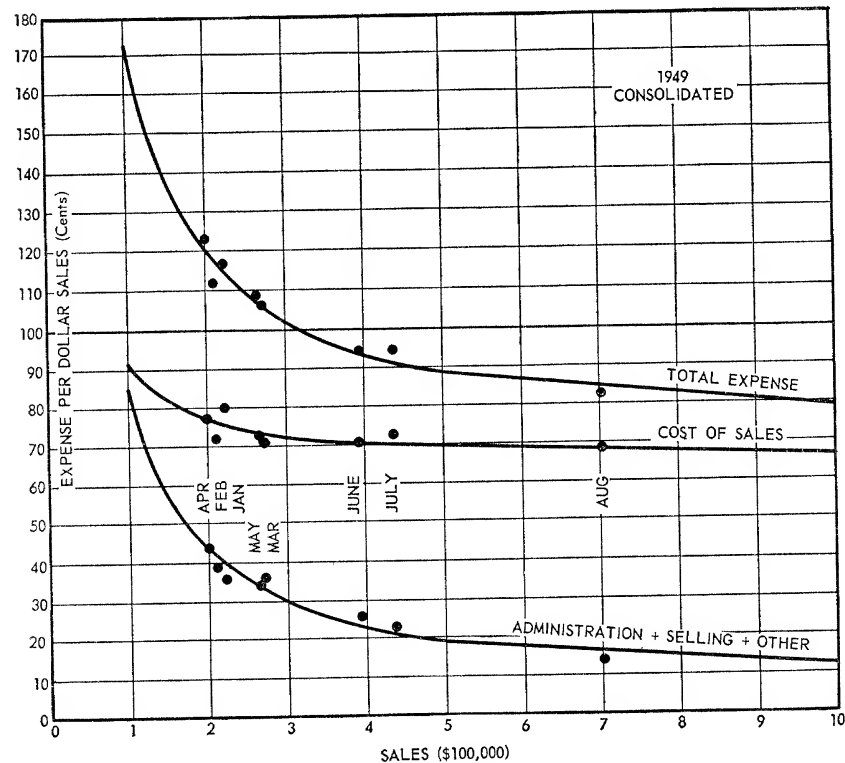


Figure 38. Cents Cost per Dollar of Sales

The above types of charts are typical of the kinds which are useful to the directors of a company in formulating the policies and administrative directives which in their judgment may be needed to effect the necessary controls to operations and expenses. Charts of this character are also very useful to illustrate to the directors the probable effects on the current budget of proposals concerning the operations of the business, and of changes in market conditions affecting prices,



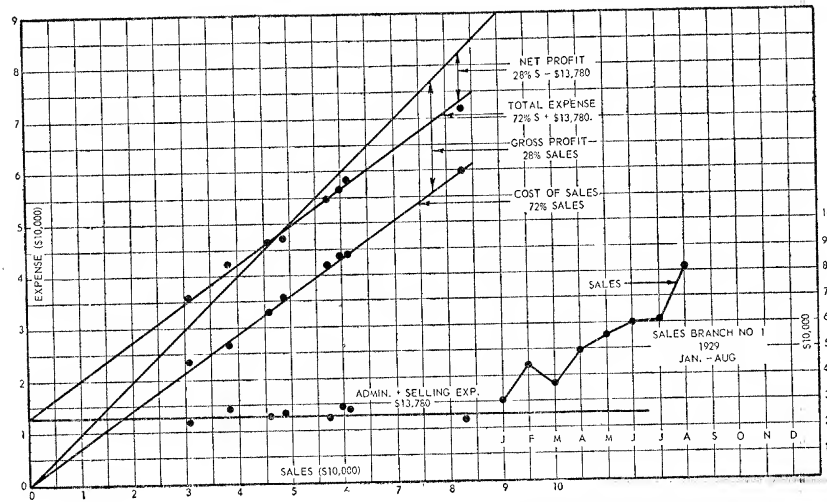


Figure 39. Break-Even Chart for Sales Branch

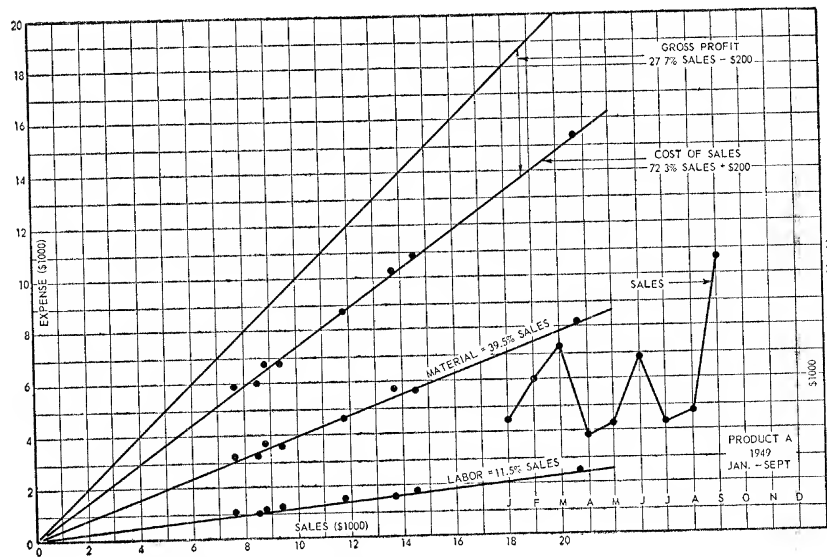


Figure 40. Break-Even Chart of a Product

and the costs of materials and labor. In addition to graphs of the above character it is generally helpful to report the items of the profit-and-loss statement in terms of both actual and budgeted for the current month and cumulative to date.

By these several means the directors of the business not only become budget-conscious but they are also provided with means by which the probabilities of administrative action as affecting profits may be quickly comprehended.

#### FOR THE CHIEF EXECUTIVE OFFICER

The chief executive officer may be the president, the executive vice president, the vice president and general manager, or other appropriately entitled individual. It is his duty to manage the business within the framework of the adopted budget. He modifies the budget from time to time, in accordance with the administrative directives of the board of directors to adjust operations to conform to market conditions. To exercise these control functions, the chief executive officer must be provided with appropriate periodic reports on changes in the market. He must also be informed on operations in relation to the budget. He receives reports from each division head responsible for administering that portion of the total budget which relates to operations under his control. Among those who report on budget matters to the chief executive officer may be:

1. The sales manager
2. The works manager for production
3. The plant engineer for construction and repairs
4. The purchasing agent
5. The controller.

Depending on the type of business and its organization structure there will be other divisions of operation, the heads of which report directly to the chief executive officer. They may report weekly or monthly, as the needs of the business will determine. As an example of a type of tabular statement, the monthly report of the office manager of a certain company is shown in Figure 41. (This type of budget is not usually reducible to graphic form.) The chief executive officer should receive weekly reports on cash, inventories, and other working capital items. It is possible in many companies to give a weekly estimate of profit and loss. The chief executive officer, of course, receives the graphs such as Figures 36, 37, 38, and 39, which are later included in the reports to the directors. These graphs and tabular statements are

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1949 BUDGET					Report No. 11.
MONTHLY REPORT OF TAXES, INSURANCE & OFFICE EXPENSES					
For Month Ending May 31, 1949					
	Appropriated		Expended		Explanation or Comment
	For Month	This Year To Date	For Month	This Year To Date	
Taxes	4119.87	7467.46	301.90	8105.05	Incr.Plant No.1 Assessment
Insurance	5889.07	16836.33	8265.87	11975.86	*
Office Expenses					
N.Y. - Office Salaries	2810.00	14050.00	2787.00	13752.75	
Rent, Light & Heat	510.00	2550.00	669.62	3041.28	Includes 9th floor (new)
Stationery & Off. Supp.	452.00	2260.00	315.53	2759.95	
Telephone & Telegraph	130.00	650.00	88.12	425.90	
Bank Collection Chgs.	40.00	200.00	23.37	128.32	
Corporation Tax	21.00	105.00	20.83	104.15	
Bonding of Employees	40.00	200.00	45.00	210.00	Provides for incr. in rate
Car Fare & Sundry	35.00	175.00	134.43	591.87	#
Fire & Robbery Ins.	9.00	45.00	15.18	68.70	
Chi. - Office Salaries	1025.00	5125.00	1040.00	5480.30	
Rent, Light & Heat	125.00	625.00	89.38	697.66	
Stationery & Off. Supp.	110.00	550.00	26.94	331.53	
Telephone & Telegraph	40.00	200.00	40.00	220.49	
Boston - Office Salaries	340.00	1700.00	----	----	} discontinued
Rent, Light & Heat	85.00	425.00	----	230.00	
Telephone & Telegraph	20.00	100.00	----	----	
	15800.94	53263.79	13863.17	48123.81	
<p>* Part of Plant No. 2 insurance and Auto, Fire &amp; Theft Insurance are unpaid at May 31, 1949.</p> <p># Overtime, temporary salaries, moving partitions and other sundry items not anticipated when budget was calculated.</p>					
Signature					

Figure 41. Form for Office Manager's Monthly Budget

the factual material from which he formulates his directives for the control of operations and related expenses.

## SHOP SUPERINTENDENT

The shop superintendent has no control of the production budget but he is responsible for certain expenses in relation to operations. In a

large factory he is often capable of exercising effective control of certain details of materials costs such as spoilage and waste and of indirect labor and service costs. He may also be able, through good management, to control the cost of direct labor per unit of output. These things he does not do by himself, but as a leader he can guide those under him to effect economies in operation. To do this he must have factual material on which to proceed. This factual material is his budget of expenses; a budget which should include standard set-up times for each operation, standard times per unit of output, and detailed budgets of service costs for all levels of output. The budget may often include a scheduling of the number of supervisors or foremen to be employed at different levels of output. As output declines, certain foremen may be scheduled to spend part of their time at production, collective agreement permitting. Very frequently weekly reports on expenses incurred in relation to the budget may be the basis for meetings with the foremen and supervisors to discuss variances and ways and means for improvements.

#### THE REGULATED EXPENSES

The expenses determined in amount by administrative policy, occur in the expense categories of administration, selling, and manufacturing. In every business they cannot be maintained at less than certain irreducible minimums on lower levels to provide for sustaining operations. Between these lower levels and budgeted levels lies the area of regulation which is available for control purposes. The need for regulation is important in those industries subject to seasonal variations in activity, and to those companies having a few large customers whose orders may be curtailed unexpectedly for one reason or another. In the later cases particularly is there need for predetermining what expenses will be adjusted, and by how much, in the event of a significant decline in activity.

As was indicated above, adjustments in the regulated expenses of foremanship, supervision, and indirect labor in the factory may be scheduled to take effect upon changes in the levels of production. Expenses of administration and selling, while somewhat more difficult to regulate in relation to the level of operations, nevertheless can be regulated successfully, provided plans for such regulation are made in advance. Without such plans there is the danger of hunch decisions to promote higher levels of sales, for example, with increasing expenses over the budget, only to find that such expenses are unfruitful because of a decline of purchasing power or other conditions which cannot be

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affected by expenditures to stimulate increased consumer interest. It may be better to jettison cargo and ride the storm than to take the chance of straining the vessel and perhaps sinking the ship. There are no general rules applicable to meeting the problems of expense regulation in times of adverse market conditions, but experience has demonstrated that those companies which schedule the adjustments to be made in the event of adverse circumstances stand a better chance of survival than those which are not prepared.

### ADJUSTMENTS

The foregoing descriptions of some of the procedures and means for budgetary control illustrate some aspects of the problem when operations are more or less according to original plans. But when there is a marked change in the market or in the general economic environment which calls for major adjustments of the budget, the procedures are of an entirely different order. We will suggest some cases to illustrate adjustment procedures.

**CASE 1** A certain process industry was budgeted as to expenses and outputs on the basis of a method of production which had been standard practice with the company for many years. The research division of the company discovered a method of operation by which the efficiency of conversion of raw material into finished product was greatly increased. By present methods 100 pounds of raw materials produce 40 pounds of finished product, while by the new method 70 pounds of finished product are made. There is no new equipment required by the new method, but additional trained personnel is required to control the new process. In this case the directors decided that a changeover be made in one of the company's plants, with the understanding that if after three months the process proved satisfactory as to both yield and quality of product, then the two other plants of the company would also be changed over. The new process was successfully used and the changeover was made permanent.

The adjustment of the budget in this case was relatively simple since it affected plant operations only and even then the budget of purchases of raw materials was the principal item affected. The other item was the personnel expense in the control laboratory which required an increase. But since the new method reduced the cost per unit of output, there was a question of price policy which should be submitted to the board of directors. Their decision may result in a revision of sales fore-

cast. In the particular case in mind, the market for the product was characterized by inelasticity of demand and the cost of the product to the user represented a very small percentage of his costs. These facts were submitted to the board and the decision was made to maintain present prices. The budget adjustments made were in the purchasing schedules, salary increases in the research department, and certain needed plant improvements were scheduled because of anticipated increases in net earnings. This budget adjustment was also reflected in the break-even charts of plant operations and of the branch sales offices.

CASE 2 A certain manufacturer of household electrical products had based his sales forecast of one of his principal products on a too optimistic view of what its distributors could sell. This view was based on "letters of intent" from the distributors and not on firm commitments of purchase. No economist had been engaged to check the budget proposals against the forces operating in the general economic environment, which would have shown that the market was under the threat of a decline in purchasing power. The result was that the manufacturing schedules for this product were greater than dealers' sales and, because of lack of control, inventories began to pile up. The company's liquid position was seriously threatened by excess inventory of finished goods, by a decline of anticipated income and by commitments for raw materials, advertising, and promotion activities. This situation demanded a complete revision of the budget in every particular based on the following adjustments:

1. Immediate reduction of that part of the regulated expense not on a contractual basis.
2. Renegotiation of regulated expenses on a contractual basis, possibly involving some losses through settlements.
3. Curtailment of purchase commitments for materials and supplies.
4. Elimination of some capital expenditures which could be deferred.

In addition, an attempt was made to secure contracts for parts manufacture from other companies which were also affected by the market decline and which might find it advantageous to maintain only assembly lines in their own plants. This in time was partly successful, but at prices which mainly served to absorb some manufacturing overhead.

The main problem which arises in cases of this kind, and this was no exception, is a psychological one. Due to the threat to security, every

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executive attempts to absolve himself from blame, and suggests who is the one at fault. This attitude destroys the morale of the organization and seriously inhibits the processes of budget adjustment and reorganization of activities. Happily, in this case the psychological problem was in the main successfully solved.

Faulty forecasts of the "economic climate" and lack of sensitivity of inventory control were among the principal defects of budget organization in this company.

**CASE 3** The cases described above represent two extremes of budgetary adjustments, in one case due to the advent of favorable circumstances which did not test the strength of the budget structure, and in the other case to changes in the market which revealed a faulty foundation of forecasting and a weak mechanism of control.

In the case now to be described is found what may be termed a normal situation, in which the controls are designed so as to reveal the need for adjustment and the mechanism of adjustment is clearly defined. The case may be described in the following terms:

A company has budgeted its monthly production for the year at 100,000 units, based on its forecast of sales and its inventory budget and turnover ratio of 3 to 1. The January sales are as anticipated. In February the sales are 15 percent below those anticipated but, since that is not necessarily indicative of future conditions, no adjustments in production are made. In March the sales are again 15 percent below schedule but indications of this being a new pattern are not clear, so the situation is carefully observed but no changes are made in the production schedule. However, the lower sales pattern continues into April and it is then decided that an adjustment in the budget should be made. During February, March, and April the inventory accumulation is above schedule. It is also decided that for the remainder of the year, the sales should be forecasted at a monthly rate 15 percent lower than the budget. Having in mind that the turnover ratio of inventory to sales should be maintained at 3 to 1, it is apparent that a new production schedule must now be set which will account for:

1. The inventory accumulated above the schedule during February, March, and April,
  2. The lower inventory required for the remainder of the year because of anticipated lower sales, and
  3. To adjust these two conditions to the reestablishment of the 3-to-1 ratio of inventory to sales by the end of the year.
-

Having established the new production budget \* to meet the above conditions, the adjustments instituted to realize these ends are:

1. To issue directives to the production departments affected to reduce the direct-labor budget by a specific amount which analysis shows will lower productive output to the amount required.

2. To leave the adjustments of the factory expense, including indirect and supervisory labor, to the productive departments which have a prearranged budget of the relations which should be maintained between the monthly factory expenses to monthly direct-labor costs.

In other words, the general schedule or pattern between regulated expenses and the direct-labor payroll for different levels of direct labor having been established as part of the budget instructions, when the rate of production is changed, the only directive that needs to be given is to adjust the direct labor. Following this, the related adjustments of the regulated expenses of production are automatically made by the production department heads as an understood matter of routine. Such a schedule of the relation of regulated expenses (foremen) to direct labor is illustrated in Figure 25. When the regulated expenses are expressed in terms of the rate of production, then the pattern shown in Figure 26 is used for making the needed expense adjustments to production changes. It is important to note that only when a complete set of integrated budgets is established for the guidance of those entrusted with adjustment and control in the several areas of the business, is it possible to effect needed adjustments by a single directive such as indicated above.

The other areas of the budget such as cash, profit and loss, etc. are readily adjusted to the anticipated reduction in sales by simple arithmetic processes which require little effort in the office of the controller of the budget.

These three cases selected from many examples of the problems of budgetary control and adjustment indicate, as would others which could be cited, that the success of budgetary control rests fundamentally on having a complete and integrated budget, the algebra of which is derived from a clear understanding of the economic characteristics of the business for which the budget is designed.

Finally it should be noted that the important aspect of the previously described adjustment procedure (Case 3) is the delay before adjusting. It is one of the substantial advantages of budgetary control

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\* See Chapter VI for a discussion of the relation of the production budget to inventory turnover.



to avoid hasty decisions and their resulting ups and downs in production. By delaying action after a discrepancy is noted between budgeted and actual sales, it is possible to avoid unwanted adjustments. At the same time proper budgeting will maintain inventory within acceptable limits.

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# **PART IV**

OTHER BUDGETS—PRACTICAL APPLICATIONS

## ■ XI

### PROFIT-AND-LOSS BUDGETS

**T**HE END RESULT of the budgeting of expenses in relation to budgeted sales for the months and the year is expressed in profit-and-loss budgets on monthly and annual bases. Effective budgetary control requires the formulating of profit-and-loss budgets for the business as a whole, for divisions of the business and also by principal products or groups of products.

#### THE BUSINESS AS A WHOLE

The annual profit-and-loss budget as to gross profit, operating profit, and net profit may be set up as illustrated in the following example:

1. The budget of total annual labor cost in relation to sales is  
 $L = 12\%$  of sales
2. The budget of total annual materials cost is  
 $M = 30\%$  of sales

3. The budget of total annual manufacturing expenses or burden is  

$$B = \$30,000 + 20\% \text{ of sales}$$
4. The budget of total annual cost of sales is therefore the sum of the above, or,  

$$\text{Cost of sales} = \$30,000 + 62\% \text{ of sales}$$
5. Accordingly the budget of gross profit is  

$$38\% \text{ of sales} - \$30,000$$
6. The total annual selling expenses are budgeted at  

$$\text{Selling expenses} = \$70,000 + 6\% \text{ of sales}$$
7. The total annual administrative expenses are budgeted at  

$$\text{Administrative expenses} = \$140,000$$
8. Accordingly, the total expenses of operation of the business are  

$$\text{Cost of sales} + \text{Selling expenses} + \text{Administrative expenses}$$

$$= \$240,000 + 68\% \text{ of sales}$$
9. The budget of annual operating profit will therefore be  

$$\text{Operating profit} = 32\% \text{ of sales} - \$240,000$$
10. The estimated net of other income less other expenses for the year is  

$$\text{Net other income} = \$60,000$$
11. The annual *net* profit is thus [derivation, *Eco. Ind. Mgmt.*, 96]  

$$\text{Net profit} = 32\% \text{ of sales} - \$180,000$$
12. The annual break-even point for;  

Gross profit	B.E.	= \$78,950
Operating profit	"	= 750,000
Net profit	"	= 562,500
13. The budgeted total annual sales are \$1,200,000. Therefore the budgeted annual profit-and-loss statement will read as in Table XVII.
14. The monthly expenses for each month of the year will vary as to totals because of differences in sales and in manufacturing schedules. Since the months are not equal as to working days, there will also be inequalities from month to month as to certain constant costs.  

In those businesses in which there are variations in the sales mixture due to the seasonal demands for certain products, there will be differences in expenses and hence in profit margins for the same total sales output. In view of all the above considerations the budgeting of monthly profit-and-loss anticipations as  $\frac{1}{12}$  of the annual constant ex-

penses, plus the same ratio of variable expenses to sales, may not be an adequate measure of anticipated performance. In many businesses, however, the monthly budget of expenses and of profit and loss may be closely approximated for practical control purposes by establishing the constant monthly expenses at  $\frac{1}{12}$  the annual constant expenses and determining the total of variable expenses proportionate to the budgeted monthly sales. For instance, in the example given above, if the sales for any month are budgeted at  $\frac{1}{10}$  the annual sales or \$1,200,000 then the profits anticipated for the month will be:

Gross profit	38% of \$1,200,000 — \$ 2,500
Operating profit	32% of \$1,200,000 — \$20,000
Net profit	32% of \$1,200,000 — \$15,000

Finally, accounting problems may arise, due to the use of standard costs, which implies the need for variance accounts. It would not be within the scope of this study fully to investigate such problems. For the benefit of the reader who may want to use it as a reference, a form is given in Figure 42. This form is in use in a large manufacturing corporation for profit-and-loss budgeting.

Items on lines 2, 3, and 4 give the amount of *actual* expenditures for material, labor, and overhead during the period.

Item on line 8 (inventory increase or decrease) reconciles the production costs (actual cost of lines 2, 3, and 4) with the cost of sales (line 10) which is, as usual, based on sales—i.e., on shipments.

TABLE XVII  
ANNUAL PROFIT AND LOSS

Sales		\$1,200,000
Cost of sales		
Material	360,000	
Labor	144,000	
Factory burden	270,000	
Total		774,000
Gross profit		\$ 426,000
Administrative expenses		140,000
Selling expenses		142,000
Operating profit		\$ 144,000
Other income—Other expenses		60,000
Net profit		\$ 204,000

As the cost of sales (line 10) is given at standard, another reconciliation is needed, this time between standard and actual cost. This is the purpose of items on lines 14, 15, 16 (over-or-under absorbed—variance in material—cost of sales, actual).

Other items and the columns of the form in Figure 42 are self-explanatory.

### DIVISIONS OF THE BUSINESS

The budgeting of profit and loss for the divisions of a business is often necessary, not only for the establishment of effective control but also for psychological reasons. For example, in one situation in which the writers were engaged, the manufacturing division and the sales division were at odds over their respective contributions to the success of the business to such a point that the manufacturing division claimed it was no use to save on expenses since the sales and administrative divisions would squander any savings in useless advertising and entertainment expenses. The business was not operating on a budget at the time, but one of the points which sold the factory personnel on the idea of budgeting was that it would have its own separate expense budget with an income of its own. It was agreed that the administrative personnel above the vice president in charge of manufacture should be carried in the sales and administrative expense budget and that a fair discount to be allowed for sales and administration was 40 percent. On this basis, the factory "sold" its products to the sales and administrative division at 60 percent of list price. This company sold an office machine of one type but in different sizes. Through this apportionment of income, both divisions of the business, manufacture and administration and selling, had their own break-even charts, expense budgets, and income accounts. In fact, each was treated as a distinct entity from the standpoint of profit and loss budgeting. The effect on the management of both divisions was very wholesome.

In situations in which the company manufactures a variety of products which have different gross profit margins but for which the marketing expenses are quite different, the apportionment of the sales dollar should be different for each group of products. An equitable rule to follow in such cases is to divide the sales dollar in the proportions of the budgeted annual expenses of manufacturing and marketing each group of products. Thus, if for Group A, for example, the budgeted annual expenses of manufacture and of marketing and administration

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PROFIT & LOSS VS. BUDGET - . . . . . AND 1st . . . MONTHS OF 1948						
Line No.		Actual		( Weeks)		%
		Budget	O/H	Actual	Budget	
						( Months)
1	Sales					
2	Material					
3	Labor					
4	Overhead					
5	Fuel					
6	Inventory Beginning					
7	Inventory Ending					
8	INVENTORY INCREASE OR DECREASE					
9	INVENTORY OBSOLETE PROVISION					
10	COST OF SALES (\$FDI.)					
11	Gross Operating Profit					
12	Actual Overhead					
13	Standard Overhead					
14	Over or Under Absorbed					
15	Variance in Materials					
16	COST OF SALES (ACTUAL)					
17	Gross Operating Profit					
18	Gross Operating Profit					
19	(% to Sales)					
20	Selling Expense - Royalties					
21	Selling Expense - Advertising					
22	Selling Expense - Regular					
23	Selling Expenses					
24	STAFFING COSTS					
25	(% to Sales)					
26	Labor Tax - State & Fed., Unempl., Soc. Sec.					
27	Administrative Expense					
28	Administrative Salaries					
29	ADMINISTRATIVE - TOTAL					
30	(% to Sales)					
31	Other License and Expense					
32	Bonus - Year-End					
33	OTHER EXPENSE - TOTAL					
34	(% to Sales)					
35	SETTLING AMOUNT AND OTHER - TOTAL					
36	(% to Sales)					
37	NET TRADING PROFIT (Before Affil.)					
38	(% to Sales)					
39	Service Compensation - Toronto					
40	Service Compensation - Affiliates					
41	NET AFFILIATE SHARE OF AFFIL. DIVIDENDS					
42	NET PROFIT (Before State and Fed. Taxes)					
43	(% to Sales)					
44	State Franchise Tax					
45	Federal Taxes					
46	Total State & Federal Taxes					
47	(% to Sales)					
48	NET PROFIT					
49	(% to Sales)					
50						

Figure 42. Form for Profit and Loss Budget



are as 50 to 50, then 50¢ of each sales dollar is assigned as income to manufacture. If the proportions for Group B are as 70 to 30, then 70¢ of the sales dollar of this group is attributed to manufacture. By this kind of a provision the relative contributions of each division of the business to profit and loss can be more readily visualized and administrative policy more clearly formulated.

In a situation in which the writers are currently engaged, the company has three major geographic sales divisions which we will designate Divisions A, B, and C. The relative profitableness at the present time in terms of profits per dollar of sales in relation to total sales is as shown in Figure 43. It is only fair to state that this is an analysis of

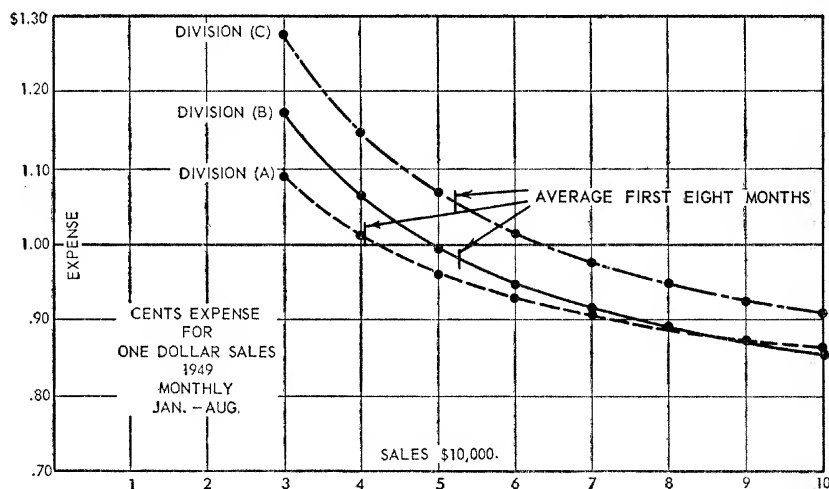


Figure 43. Cents Cost per Dollar Sales for Three Divisions of a Business

current operations prior to the establishment of budgetary control. It indicates clearly where the problem of reorganization of operations lies before budgeting.

In another situation the company manufactures piece parts in four plants and finishes the final product in seven assembly plants. The main office of the company is maintained in another city. In this case the four parts plants and the seven assembly plants must each have a separate budget of expenses in relation to activity or rate of output. Can a profit-and-loss budget be set up for each plant and if so, how may it be done? Fortunately, the products the company manufactures are relatively simple and contain relatively few parts.

In a situation of this kind, as far as the control of each individual plant is concerned, the budgeting of the gross profit before charges for administration and selling is the only meaningful and useful profit budgeting to use. The expenses for administration and selling are not related to parts- and assembly-plant operations. They can only be related to the combined gross profit of the several plants, and appear in the profit-and-loss budget for the business as a whole.

The budgeting of gross profit and loss is therefore the more easily accomplished. The procedure is to establish both an expense budget for each plant for different rates of output and also a "selling" price for each part and each assembly so as to provide an "income" budget. The expense budgets are made up by methods already described. The "selling price" of the output is the principal matter to be settled.

#### ASSEMBLY-PLANT PROFITS

One of the difficulties encountered in forecasting gross income is that the plant must produce different "assemblies" which are sold, at different contract prices, to a number of companies. The gross profit margins will accordingly vary among the assemblies produced and sold. For example, Assembly A will have a material and labor cost of \$7.00 while Assembly B, styled somewhat differently but containing about 80 percent of the same size and type parts as Assembly A, will cost \$7.50 for labor and material. Yet A will sell for \$13.00 while B will sell for \$16.00. This means that in the annual forecast of sales, the quantities of sales anticipated must be classified and grouped according to the sales mixture. From such groupings by the year and by months the estimates of the expenses for labor, material, and factory burden may be made and the income according to sales mixture may be forecast.

The products which this company produces are sold to other manufacturers, who incorporate them into their own products sold to the consuming public. The purchaser authorizes a schedule of releases or shipments only a few weeks in advance and often cancels some authorizations for shipment and sometimes advances and increases shipment schedules according to his own dealer demands. The budget officer is therefore under the necessity of periodically revising his forecasts of shipments as to both amounts and composition of sales mixture and hence his forecasts of income from sales, month by month, and finally the anticipated monthly profit and loss. The revision and adjustment of

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such forecasts is greatly facilitated when standard costs as to materials and labor are used, and when the effect of the sales mixture on the total variable expenses and hence on profits is properly formulated. The formulation is as follows:

When a given quantity ( $Q$ ) of a product is sold at a unit price ( $p$ ) the income from sales is  $Qp$ . The total variable costs for quantity  $Q$  are  $v$  and are independent of  $p$ . The ratio of total variable costs to sales

is, however, a function of  $p$  and is  $\frac{v}{Qp} = b$ . The constant monthly costs of manufacture are  $a$  and are independent of  $Q$  and  $p$ .

The trend line of expense is as shown in Figure 44. When the same quantity of product ( $Q$ ) is sold at price  $p'$  the values of  $a$  and  $v$  are not altered but the trend line of expense is altered and its slope is

$$b' = \frac{v}{Qp'} \text{ as shown in Figure 44.}$$

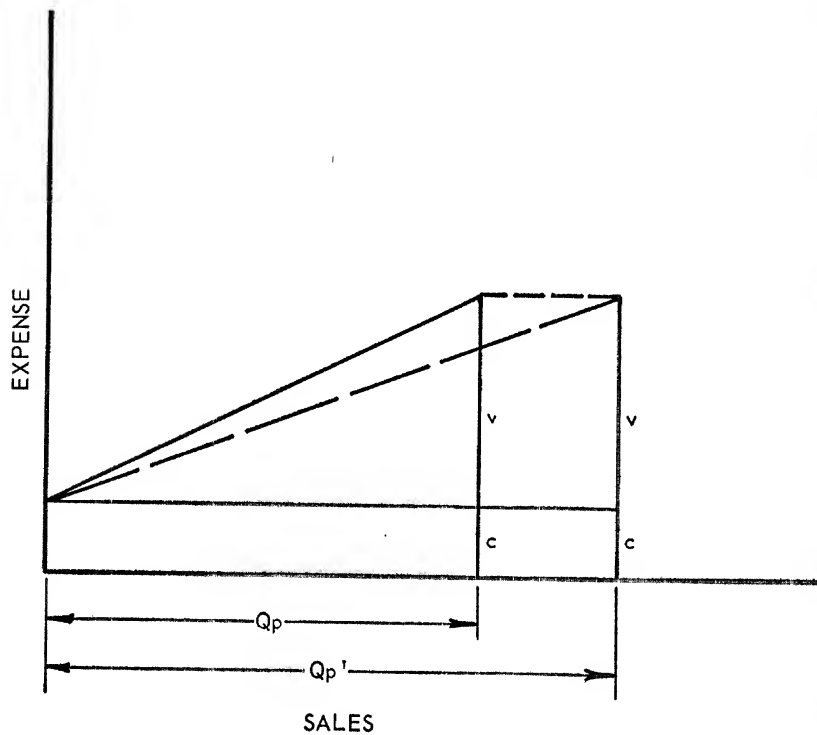


Figure 44. Expense Trends at Different Selling Prices

Accordingly a change in price from  $p$  to  $p'$  results in a change in slope of the variable expense from  $b$  to  $b'$  in which  $b' = b \frac{p}{p'}$  since  $\frac{v}{Qp} = b$  and

$$\frac{v}{Qp'} = b'$$

then

$$\frac{v}{Q} = bp$$

and

$$\frac{v}{Q} = b'p'$$

or

$$b' = b \frac{p}{p'}$$

Since the equation of profit is:

$$\begin{aligned} P &= Qp - (a + bQp) \\ &= Qp(1 - b) - a \\ &= Q(p - bp) - a \end{aligned}$$

then

$$\begin{aligned} P' &= Qp'(1 - b') - a \\ &= Qp'(1 - b \frac{p}{p'}) - a \\ &= Q(p' - bp) - a \end{aligned}$$

and the *difference* in profit is:

$$\begin{aligned} &[Q(p' - bp) - a] - [Q(p - bp) - a] \\ &\text{or } Q(p' - p) \end{aligned}$$

But when a number of products are sold and the mixture consists of quantities  $Q_1, Q_2, Q_3, Q_4, \dots, Q_n$  and each quantity is manufactured at different variable costs  $v_1, v_2, v_3, v_4, \dots, v_n$ , the determination of the total expense trend and hence of profits is found as follows:

Expense trend

$$\begin{aligned} Q_1 &\text{ is } a_1 + b_1 Q_1 p_1 \\ Q_2 &\text{ is } a_2 + b_2 Q_2 p_2 \\ &\text{etc.} \\ &\text{etc.} \end{aligned}$$

from which the total expense trend is:

$$\text{Total expense} = a + bx$$


---

where

$$a = \text{total constant costs} = a_1 + a_2 + \dots + a_n$$

$$x = \text{total sales}$$

$$= Q_1 p_1 + Q_2 p_2 + \dots + Q_n p_n$$

and

$$b = \frac{Q_1 p_1 b_1}{x} + \frac{Q_2 p_2 b_2}{x} + \dots + \frac{Q_n p_n b_n}{x}$$

$$= \frac{v_1 + v_2 + \dots + v_n}{x}$$

For example, if three products are sold in quantities  $Q_1 = 1,000$ ,  $Q_2 = 2,000$ ,  $Q_3 = 3,000$  at prices,  $p_1 = \$5.00$ ,  $p_2 = \$6.00$ , and  $p_3 = \$7.00$  then  $x = \$5,000 + \$10,000 + \$21,000 = \$27,000$ . Let the constant unit standard costs for labor and materials be \$1.00, \$1.50, and \$2.00 respectively:

Then

$$v_1 = \$1,000$$

$$v_2 = 3,000$$

$$v_3 = 6,000$$

$$v = 10,000$$

from which

$$b = \frac{v}{x} = \frac{10,000}{27,000} = 0.37$$

where  $a = \$8,000$

$$\begin{aligned} \text{Then the gross profit} &= x(1 - b) - a \\ &= 27,000(1 - 0.37) - 8,000 \\ &= \$9,000 \end{aligned}$$

Thus, for any combination of quantities sold at different prices, and with standard unit costs for each product the gross profit can be quickly found.

### PARTS-PLANTS PROFITS

In Appendix D is found a method for determining the output value of piece parts of a product, based on the relation of the standard cost of the piece part to the standard cost of final product and then to the selling price of the final product. Thus if the standard cost of a piece part is 2 percent of the standard cost of the final product, its output value is determined as 2 percent of the selling price of the final prod-

TABLE XVIII  
PROFIT AND LOSS BUDGET BY PRODUCTS

	Product A		Product B	
	VARIABLE	CONSTANT	VARIABLE	CONSTANT
Sales	\$2,913,000.		\$3,330,300.	
Admin. Exp.	—	\$121,500.	—	\$102,500.
Selling Exps.	90,000.	89,500.	372,000.	118,500.
Plant Admin.	363,000.	234,700.	51,000.	50,000.
Material	1,143,400.	—	2,148,800.	—
Labor	550,000.	—	152,300.	—
	<u>\$2,146,400.</u>	<u>\$445,700</u>	<u>\$2,724,100.</u>	<u>\$271,000.</u>
Total Cost	\$2,592,100.		\$2,995,100.	
Operating Profit	<u>320,900.</u>		<u>335,200.</u>	
<i>Break-Even Point</i>				
Annual	\$1,704,000.		\$1,500,000.	
Monthly	142,000.		125,100.	
Weekly	32,800.		28,900.	
Daily (300 Days)	5,700.		5,000.	
% of Sales	58.5		46.5	
<i>Sales Required to make 15% return on Investment</i>				
	\$2,500,000.		\$1,200,000.	

uct. But when the piece part is used in a number of assemblies which are sold at different prices, then not only is the standard cost of the piece part a different percentage of the standard cost of the different assemblies, but the ratio of the selling price to standard costs also varies for each type of assembly. How then is it possible to determine the output values for the piece parts of the parts-manufacturing plants?

It is at once apparent that the parts plants should be treated as independent plants whose products are sold at a predetermined profit regardless of the use to which put by any purchaser. Accordingly, the output value of each piece part must be arbitrarily established at some percent of the standard cost, say 130 percent or other appropriate amount. By this means the output or "income" of any monthly production may readily be determined. The actual expenses for labor, materials, and factory burden compared to the budgeted amounts of such expenses gives the variances for each of these types of expense and also the variance in profit and loss.

TABLE XVIII  
PROFIT AND LOSS BUDGET BY PRODUCTS

Product C		Product D		Product E	
VARIABLE	CONSTANT	VARIABLE	CONSTANT	VARIABLE	CONSTANT
\$720,000.		\$600,000.		\$400,000.	
	\$31,500.	—	\$34,700.	—	\$37,000.
55,500.	20,500.	136,000.	15,900.	68,000.	8,700.
71,500.	22,700.	30,900.	23,000.	12,500.	32,700.
270,400.	—	266,100.	—	166,000.	—
\$506,300.	\$74,700.	\$483,000.	\$73,600.	\$300,500.	\$78,400.
108,900.	—	50,000.	—	54,000.	—
\$581,000.		\$556,600.		\$378,900.	
139,000.		43,400.		21,100.	
\$252,000.		\$378,000.		\$314,000.	
21,000.		31,500.		26,200.	
4,850.		7,250.		6,030.	
840.		1,260.		1,050.	
35.0		63.0		78.5	
\$560,000.		\$160,000.		\$230,000.	

#### PROFIT AND LOSS BY TYPES OF PRODUCTS

Many companies are engaged in multi-product manufacture to such an extent that it is often difficult to ascertain the accountability of each group of products for their contribution to the total profit or loss of the business. This is particularly difficult, and incidentally most important, for small firms housing manufacturing operations in one plant. The difficulty resides very largely in the problem of apportioning the factory burden among the kinds of products manufactured. When the production mixture by types of products manufactured is fairly uniform for the year, the apportionment of the factory burden according to types of products is readily accomplished. If, however, the production mixture anticipated in the budget is materially departed from, then the factory burden shifts and budgeted estimates of costs and profits are not valid and must be adjusted to the facts of sales.

As an example of a budgeted estimate of annual profits by products, we submit in Table XVIII the budget of a company which manufactured five groups of products, which for obvious reasons are designated by A, B, C, D, and E. Three of these products—A, B, and C—were manufactured at one location. Products D and E were manufactured each in other factories in different locations.

## XII

### CASH BUDGET

ONE of the first rules of business is that the payroll must be met on Friday night. Otherwise, the plant might just as well remain closed on the following Monday. It would be of no help to tell the workers that the production has already been sold on credit at a very good profit for future delivery. They want cash and they want it on Friday night.

The cash situation, although closely related to the other activities of the business, should nevertheless be considered for itself. Sales on account, for instance, may be highly profitable; they do not mean immediate cash. Even made at a loss, cash sales may sometimes seem to be preferable.

The cash budget, as well as the other budgets already studied, is nothing more than a reasonable estimate of a future performance. The budgeter, in this case, forecasts cash receipts and cash disbursements. The cash on hand at the end of any future period, the determination of which is, in final analysis, the purpose of cash budgeting, is equal to the



cash on hand at the beginning of the period plus (or minus) the difference between cash receipts and cash disbursements during the period.

Yet, due to the very special requirements of the cash equilibrium, which is closely but only indirectly related to the final profit or loss made by the business, cash budgeting presents problems of its own, substantially different from the ones considered in the previous chapters.

An example will illustrate:

On Monday, at the start of the business, a given organization faces the following situation.

Cash on hand	\$ 10,000
Accounts receivable	95,000
Notes payable	200,000
Accounts payable	33,000

Based on the production scheduled for the week, the next weekly payroll will be about \$8,900. No other salaries are to be paid at this time.

The sales budget indicates a probability of \$20,000 of sales during the coming week. What will be the cash situation on the following Monday? Obviously the answer to this question cannot be given by simply deducting the above liabilities from the above assets and adding the probable sales to the total.

A further investigation is in order. Such an investigation may reveal the following facts.

1. *Accounts receivable*

The ABC Company, which usually takes advantage of the 2% ten-days' discount, owes us, since last Thursday	\$45,000	
The KLM Company, a reliable business, owes us, at net 30 days, due tomorrow	\$ 5,000	
The RST Company was invoiced two months ago, 2% 10 days, net 30 days	\$35,000	
The WXY Company was invoiced as of today in the same conditions	\$10,000	
		<hr/> \$95,000

2. *Notes payable*

One due in 30 days	\$100,000	
One due in 90 days	\$100,000	
		<hr/> \$200,000

3. *Accounts payable*

To the P Company, invoice received last week, net 30 days	\$13,000	
To the same company, invoice received a month ago	\$10,000	
To the R Company, invoice received last week, net 30 days, 2% 10 days	\$10,000	
	<u>          </u>	\$33,000

4. *Sales*

Past experience shows that about		
¼ of sales are cash	\$ 5,000	
¾ on account	\$15,000	
	<u>          </u>	\$20,000

This analysis shows that, at or before the end of the current week, some disbursements must be made, namely:

Payroll	\$ 8,900
The P Company	10,000
Total	<u>\$18,900</u>

Should the cash situation permit, it would also be advisable to take a discount by paying during the week:

The R Company	\$10,000
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The following disbursements do not need to be considered at this time:

Notes payable	\$200,000
The P Company	13,000

To make the required disbursements, even limited to the "must disbursements," the cash on hand (\$10,000) will not be sufficient. What cash receipts are to be expected during the week?

Some of the future cash receipts should not be expected at all at this time. Such are:

The RST Company (which appears as a possible default)	\$35,000
The WXY Company (due next month)	\$10,000
Sales on account	\$15,000
Total	<u>\$60,000</u>

One of the future cash receipts might conceivably be in during the week:

The ABC Company	\$45,000
-----------------	----------

assuming that this company follows its usual policy of discount taking.

Some of the future cash receipts are reasonably sure during the week:

The KLM Company	\$ 5,000
Cash sales	5,000
Total	<u>\$10,000</u>

In final analysis:

"Must" disbursements are	\$18,900
Cash on hand	\$10,000
Reasonably sure receipts	\$10,000
give a total of	<u>\$20,000</u>
The cash balance at the end of the week will be	\$ 1,100

which does not leave a sufficient amount of cash to discount the R Company invoice of \$10,000 unless the ABC Company pays its bill for \$45,000.

Should the general economic situation and the money market suddenly tighten, the ABC would probably not take advantage of the discount offered. Furthermore, the *cash* sales may be less than expected, even if the sales should be equal to the sales budget. As a result, the budgeted balance of \$1,100 may not be considered as offering a sufficient degree of guaranty.

In such a case, the budgeter will make sure that he might, in case of need, have recourse to additional sources of cash. Such additional sources may be, for instance, a line of credit extended by the bank or stocks in portfolio, that can be sold or given as collateral for a loan.

The above example illustrates the special difficulties encountered, which are essentially due to two fundamental characteristics of cash budgeting:

1. *The timing is inelastic.* Low sales during a given week may be due to accidental circumstances and may be compensated by the high sales of the following week without affecting the sales budget. Cash shortages, on the contrary, are always very troublesome and may be fatal to the business even if they are of short duration. The timing of the cash budget is inelastic.

2. *The values are subject to qualifications.* A dollar of expense is a dollar of expense—no more or less. The budgeter is not concerned with the recipient of the dollar, when budgeting expense. Nor is he, when budgeting sales, concerned with the person of the buyer. When it comes to cash, the budgeter handles values that are of a relative character. Some cash receipts are doubtful, some cash disbursements are absolutely mandatory, others may be deferred. The budgeter cannot readily compare each dollar of receipt or disbursement with any other dollar of receipt or disbursement. Their values are not always interchangeable nor can they always be balanced; they are subject to qualification.

These two fundamental characteristics of cash budgeting, the inelasticity of timing and the fact that values are subject to qualifications, create new and special problems for the budgeter. Yet, cash budgeting is an inherent part of a well-balanced budgetary control.

Limited to sales, inventory, production, and expense budget, the budgetary control will no doubt constitute an improvement upon a non-budgeted business. At the same time, the lack of cash budgeting will be either dangerous or expensive.

If the working capital is just about what is needed, cash shortages are bound to occur, one day or another. This is dangerous.

If, on the contrary, the working capital is so abundant that the business just does not have any cash problem at all, the chances are that such a business could be run with substantially less working capital by budgeting the cash. The working capital in excess could then be used for other and more remunerative purposes. To ignore such a possibility is expensive.

Such are the reasons why the need for cash budgeting is generally recognized by business organizations. In fact, many firms have adopted one form or another of cash budgeting even though they have not introduced a whole procedure of budgetary control. Such an approach creates additional difficulties and should not be encouraged. Reference is made to the results of special studies concerning the possibility of cash budgeting without any other budgets [especially, Met. Life Ins. Co., 1937]. In this book, cash budgeting will be considered only in the case of a business enjoying a whole and well-integrated budgetary control of which cash budgeting is part.

In such a case, the estimates of cash receipts and disbursements are made on the basis of reliable forecasts of income and expense.

An income, in the accounting sense of the word, does not mean an

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actual cash receipt. In like manner a disbursement, at least in its timing, is distinct from an expense.

Thus, although the sales budget, the expense and capital expenditures budgets are the basis on which the cash budget is being established, there is still a need for a close analysis of the financial facts, as to their precise timing and as to their true character—immediacy of a debt; reliability of an income. (For definition, see page 217.) The inelasticity of timing and the fact that values are subject to qualification—these two fundamental characteristics of the cash budget dominate the whole pattern of cash budgeting, which will now be presented in terms of:

- I The period
- II The content
- III The flexibility
- IV The procedure and presentation of the cash budget.

#### I. CASH BUDGET PERIOD

Considered as an element of the whole budgetary control, the cash budget will normally extend over the usual yearly period. A detailed survey, as a matter of fact, confirmed that such is the policy followed by most of the budgeted businesses [Met. Life Ins. Co., 1937].

At the same time, the element of uncertainty involved is much greater in cash budgeting than in the other budgets. So is the size of the possible variations. The reasons for this difference are the direct consequences of the already mentioned fundamental characteristics of cash problems. The inelasticity of timing and the lack of reliability surrounding some receipts are the possible sources of sudden disappointments. The longer the period separating the forecast from the actual performance the greater the chances of substantial discrepancies between the estimate and the actual facts.

Furthermore, numerous situations involving cash require long-range planning. Such are, for instance: reimbursement of bank loans, redeeming of bonds and, generally speaking, any situation in which the business will face a mandatory need for cash. The longer the range of planning, the better the chances of avoiding a cash shortage.

How is it possible to conciliate this obvious need for long-range cash budgeting, on a yearly basis, with the inelasticity of timing and the relative character of some values involved in the forecast?

Experience shows that conciliation is possible and satisfactory results are obtained by using a method of progressive budgeting which com-

bins the protection offered by long-range planning with the greater accuracy of short-range planning. This method proceeds as follows:

A first estimate of cash receipts and disbursements is made for a period of 12 months, by using the sales, expense, and capital expenditures budgets as a basis. This first estimate, although made as accurately as possible, is considered only as an approximation.

This yearly budget is broken down in shorter periods (a month, a week, or two weeks). At the end of each of these shorter periods, a reevaluation of the forecast for the periods immediately following is made. Let us say, for instance, that a cash budget has been prepared week by week for the year 1950. The forecast was made some time in December 1949.

On Thursday, January 5, 1950, the estimate of the two weeks Monday January 9 to Saturday January 14, and Monday January 16 to Saturday January 21 is reviewed. The week January 9 to 14 is forecasted in final form. On Thursday January 12, the week January 16 to January 21 is reviewed once more and a final forecast is made. At the same time, the original budget for the week Monday 23 to Saturday 28 is submitted to a first review.

In other words: *Each week, the following week is budgeted in its final form by revising a reevaluation, made the week before, of the original estimates, made at the time the whole year was being budgeted.* At the same time, a reevaluation is made of the same original estimates related to the week following the next one.

Each week (or any period of two or four weeks chosen as elementary period) is therefore budgeted three times:

FIRST: At the time of the original yearly budgeting.

SECOND: At the time of the first revision, one week (or period) before the start of the week (or period) under consideration.

THIRD: At the time of the final revision, in the days immediately preceding the start of the week (or period).

Such a method of progressive budgeting is of current use and gives very satisfactory results.

It should be kept in mind that, as a rule, unfulfilled cash forecasts are merely transferred to the following period. This is because forecasted cash receipt or disbursement, having their origin in an actual income or expense that are already facts of the past, may be delayed but cannot usually be canceled. Most of the cash transactions are the unavoidable consequence of a *fait accompli*.

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## II. CASH-BUDGET CONTENT

By adding on one side all the receipts and on the other side all the disbursements forecasted for the period and balancing the former by the latter, the budgeter would often reach very erroneous conclusions. For instance, \$8,000 of payroll are not the equivalent, as to time elasticity, of \$8,000 of accounts payable. The payroll has a mandatory character that in normal circumstances is not that of an account payable. Again, the \$8,000 payroll can be balanced by \$8,000 cash on hand but should not, for obvious reasons, be balanced by an \$8,000 account receivable, even if payment is due.

Some classification of receipts and disbursements is in order if one wants to avoid mistakes and disappointments. The classification should be such that, within each class:

1. The forecasted receipts have a comparable degree of *reliability*.
2. The forecasted disbursements have a comparable degree of *immediacy*.
3. The reliability of the former ones be comparable to the immediacy of the latter ones.

By reliability of the receipt is meant the reasonable degree of probability that the receipt will find place during the period considered and not later on. For example: a note receivable should be considered as having a definitely higher reliability than an account receivable, unless, of course, the note's underwriter is on the eve of being in default.

By immediacy of the expense is meant the degree of flexibility in the payment to be made. The payment of the payroll is a must, while the intended purchase of raw material for stock, for example, may be deferred, if need be.

Such considerations will govern the pattern of classification followed by the budgeter. He will add and balance only estimates of comparable reliability or immediacy.

In each individual case, a classification should be adopted that will best serve the particular need and purpose of a given business.

As a general approach to the problems, the authors have found that, in many cases, a dual classification of all expected receipts and disbursements will be sufficient, the two categories being:

- I. The definite receipt and disbursement
- II. The probable or optional ones.

These two categories are self-explanatory. A review of the usual items found in each of them will illustrate their nature.

Neither of the two includes the *cash on hand* which is merely added, at any time, to the balance of cash increase (or cash decrease) resulting from the cash forecast.

#### I. DEFINITE CASH RECEIPT AND DISBURSEMENT

##### A. Definite Cash Receipt

###### 1. *Collection of notes receivable*

The payment of a note on due day is mandatory for the underwriter. The sanction is the *protest*, a rapid procedure which starts at the very minute a note, while due, remains unpaid. Such a procedure is very damageable for the credit of the underwriter and, normally, a note is paid on due day. Therefore, unless special information is received, indicating that the underwriter is in a difficult financial position, the budgeter will consider the notes payable as a definite cash receipt on the day on which the notes are due. Their collection is considered as a certainty.

###### 2. *Collection of accounts receivable*

Such is not the case for the collection of accounts receivable. Unless the business is conducted under exceptional conditions, there is no guaranty that an account receivable will be collected at an absolutely precise day. A week or even a few weeks' delay, after due date, are to be expected, a disturbing factor in the matter of cash budgeting, the timing of which, as already emphasized, is inelastic.

If the number of accounts is sufficiently great to justify an application of the statistical concept of probability, the budgeter will endeavor, on the basis of past collection experience, to determine the amount he is reasonably sure to collect during a given period.

The ratio of debt outstanding to annual sales, multiplied by 360 indicates the average number of days usually required for the collection of accounts receivable [*Eco. Ind. Mgmt.*, III, 54 et seq.]. Such an average is subject to:

Regional changes

Seasonal changes (for instance, at Christmas time, collections slow down)

Changes due to exceptional factors, such as a strike or general economic conditions.

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For instance: the year 1948 shows for a given business an average outstanding debt of \$500,000 for annual sales of \$6,000,000; the ratio

$$\frac{\text{debt outstanding}}{\text{sales}} \cdot 360$$

is equal to

$$\frac{500,000}{6,000,000} \cdot 360 = 30$$

indicating that the average collection period is 30 days.

Budgeting the year 1949, the budgeter, aware of a certain slow-down in economic conditions will, in his forecast, lengthen the probable collection period to maybe 35 or 40 days.

Furthermore, if many customers reside in the Pittsburgh district, and if a steel strike is on the way, the budgeter lengthens even more the probable collection period in this district.

If the budgeter is in doubt, it will be a wise policy to make a conservative estimate of the collection considered as certain and transfer from the "definite cash-receipt estimate" to the "probable cash-receipt estimate" an additional part of the account receivable.

### 3. *Cash sales*

By using similar methods, the budgeter will determine what part of sales is usually made on a cash basis. The ratio cash sales to sales on account, adjusted for seasonal variations and economic or other changes, is applied to the sales budget to determine the cash sales receipt expected.

It may again be a wise policy to make a conservative estimate of the cash sales considered as certain and transfer an additional amount to "probable cash receipt."

### 4. *Miscellaneous receipts*

Depending on the conditions in which a given business operates, a few other items may be considered by the budgeter as implying a certainty of cash receipt on due day. Such may be, for instance:

- Interest received (banks and notes)
- Property rental income
- Dividends received (on stocks owned by the business)
- Royalties and license fees
- Reimbursement of a loan, etc.

## B. Definite Cash Disbursement

1. *Payroll*

The direct-labor and the factory-expense budget provide a reliable estimate of the payroll. Slight variations should be expected due to bonus computation, possible overtime, etc. This disbursement is generally made each week.

2. *Salaries (employees, salesmen, executives)*

The factory, selling, and administrative expense budgets provide a reliable estimate in similar conditions, with the possibility of substantial variations due, especially, to the irregular pattern of some selling expense (salesmen commission, traveling expense, etc.). This disbursement is generally a monthly one.

3. *Notes payable. Redeemable bonds. Interest.**Sinking fund instalments*

These have a mandatory character. Reference is made to what was previously said concerning the notes receivable. The amount to be paid is always known accurately and so is its timing.

4. *Accounts payable*

Although the payment of an invoice on due date is not of the same mandatory character as that of a note or a bond, undue delays are damageable to the organization's good standing. Due payments will therefore be budgeted, as a rule, as a definite cash disbursement. Their amount and timing are always known accurately.

Anticipated payment for the purpose of discount taking is an optional disbursement and will be considered below.

5. *Dividends declared*

After the date at which they have been declared payable, the company's dividends become a definite commitment.

6. *Royalties and license fees*

These disbursements are due on a definite date and should be budgeted as such. The estimate is made on the basis of the production or sales budget if the amounts depend upon the volume of production or sales.

7. *Taxes*

The various taxes (payrolls, old age, unemployment, city, state, and federal) are generally due on a definite date. Their amount is usually

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known well enough in advance, so that they do not create any special budgeting problems.

## II. PROBABLE OR OPTIONAL CASH RECEIPT AND DISBURSEMENT

### A. Probable or Optional Cash Receipt

#### 1. *Additional collections*

As previously seen the budgeter may want to limit to a conservative estimate the amount of accounts receivable collection or the amount of cash sales considered as certain. In such a case, it is legitimate to consider as probable an additional amount also based on past experience and also adjusted for seasonal variations and various changes in general conditions.

#### 2. *Cash discount taken*

This cash receipt is optional. If it is taken in consideration, the corresponding cash disbursement (anticipated payment of accounts—see below) is also being budgeted.

#### 3. *Sales of securities*

This refers to the sales of stock in the portfolio. It is obviously an optional receipt.

#### 4. *Miscellaneous receipts*

Among the items generally found, the following can be mentioned:

- Transfer from subsidiaries
- Bank loans, with or without collaterals
- Bond issue
- Mortgage on real estate.

### B. Probable or Optional Disbursement

#### 1. *Anticipated payment of accounts*

Cash position permitting, it is always a good policy for a business to take advantage of a discount for anticipated payment of accounts. Such discounts are generally very substantial ones (2% 10 days—net 30 days—which is the equivalent of about 35% interest a year). They are an expensive way for the seller to collect its accounts, but a very good use of cash available by the buyer.

Cash budgeting, by giving an accurate and advanced notice of cash availability will make it possible for a business to take full advantage of such discount offerings.

#### 2. *Cash purchases*

Such disbursements are generally minor ones. They usually take the form of petty cash fund replenishments.

### 3. *Investments*

These are the important items of optional disbursement. They may take the form of purchase of stocks, loans, etc.

In fact, if a company enjoys for a substantial period of time an excess of cash available, such investments become an important part of the company's financial management. In such cases as that of an insurance company, for instance, the problem of finding a remunerative and safe investment is certainly one of the most serious ones faced by management.

### 4. *Transfers*

If a company controls a subsidiary or is controlled by a parent company, the transfer of cash is a current item. In the case of a subsidiary, it often is the rule that all the cash available in excess of a determined amount should be scheduled for transfer at prescribed times.

### 5. *Reserves, surplus*

The word reserve is indiscriminately used in accounting to cover situations which, from the point of view of cash budgeting, are fundamentally different. Two classes of reserves should be distinguished:

a. *The reserves that do not involve any cash transaction.* Such is for instance: the reserve for depreciation.

The depreciation expense is an accounting expense, reducing the book profit (or increasing the book loss) to take into account the fact that the income of the business is partly made by using, at no cost for rent, an equipment previously purchased and paid for. The capital expenditure thus involved in the past should be reimbursed over a period of years. This reimbursement, however, is not made in cash form. The depreciation expense is an accounting reduction of the profit and is actually balanced by the accounting credit to a reserve account called Reserve for Depreciation. No debit or credit is involved as far as the cash account is concerned.

Later on, after an equipment is sold or scrapped, the reserve for depreciation concerning this piece of equipment is balanced and the account closed. At no time is cash involved.

Other reserves are currently used by the accountant which do not involve any cash transaction. For instance: the reserve for bad debt or the surplus account.

The reserve for bad debt (or doubtful account) is periodically credited by debiting a bad debt expense account and debited at the time it

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becomes evident that an account receivable will not be collected. The cash account is not involved.

The surplus account does not involve any cash transaction unless the surplus is distributed in the form of dividends, in which case the surplus or part of it is first transferred to an account "dividend payable" which is handled by the cash budgeter as previously explained.

b. *The reserves that do involve cash transactions.* Such are essentially the reserves for contingencies.

For example: a business is involved in a patent suit. No one can tell what the court decision will be. It is known, however, that, should the business lose the case, it would mean paying a given amount of money that can be estimated with a certain degree of accuracy.

This amount somehow threatens the cash available. This threat will be treated by the budgeter as a probable expense and budgeted for the amount and for the time he thinks appropriate. After the case has been settled, the exact amount involved is known and substituted for the estimate. The exact time at which payment is due is also known and the expense involved is transferred to the definite cash disbursements, to be made at the time payment is due.

If the accounting is kept on an accrual basis (as is now usual in a business organization) an accrued expense which is not yet paid, a prepaid expense which was not yet due, an accrued income not yet received, or an already cashed income which was not yet earned, are all accounted for in special deferred- or accrued-items accounts.

Such accounts do not in themselves involve any cash receipt or disbursement, but they are used by the cash budgeter for a final adjustment of his estimate of future cash transactions.

### III. CASH BUDGET FLEXIBILITY

It is always necessary in budgeting—and this necessity has already been indicated—to provide for a certain margin of flexibility. Actual performance may be different from the budgeted one, either because the forecast is at fault or because sudden and unexpected circumstances change the conditions in which the business operates.

In the case of cash budgeting, a substantial amount of flexibility is even more necessary than for the other budgets, because of the consequences of a cash shortage. Actual sales, actual production, actual expense may be at variance with the budget without creating more than undesirable conditions. Cash shortage, even of short duration, is always a serious annoyance and may even be fatal to the business.

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The budgeter will certainly endeavor to make his forecasts as accurate as possible. Yet it is his primary duty, especially in the matter of cash budgeting, to foresee the unexpected by providing for flexibility.

Flexibility in cash budgeting should avoid cash shortages, whether they occur on short notice or result from an unfavorable trend of affairs slowly developing. There should thus be a short-range and a long-range flexibility of the cash budget.

### 1. *Short-range flexibility*

Its purpose is to avoid a cash shortage due to unexpected circumstances developing suddenly. A strike affecting the business or its market, the sudden failure of an important account, a series of unhappy developments or even a mistake in forecasting, which should always be considered as a possibility, may create a sudden cash shortage.

None of such possibilities can be forecasted. They are just unforeseeable. But the budgeter should, in such a delicate matter as a cash forecast, foresee the possibility of unforeseeable circumstances and be prepared for them, especially if the cash position does not show a substantial positive balance. Optional receipts, at least, should be provided for in a sufficient amount and in an adequate form. The amount and the form of such optional receipts will vary with the kind of business considered, the size of the organization, etc. The most current sources of such optional receipts will be: a line of credit in a bank, securities that can be sold or used as collateral, raw material inventory that can be mortgaged, etc.

The smaller the organization, the more difficult the problem is to solve. In fact, the problem of cash shortage developing on short notice is specifically one of a small business [U. S. Senate, 1947]. Big business always finds banks or credit organizations willing and even anxious to take its short-term notes.

### 2. *Long-range flexibility*

Cash budgeting, which will generally reduce to its minimum if not altogether suppress the risk of cash shortage developing on short notice, may disclose, some time in advance, the threat of a future shortage. This calls for long-range cash flexibility.

The shortage may appear as a permanent problem due to a lack of working capital or be of a temporary nature, merely threatening the cash position during a given period.

In the former case, the problem involves a decision of high policy with reference to the financing of the business. It calls for such mea-

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asures as: issuance of bonds, selling of additional stock, common or preferred, long-term loan, etc.

In the latter case, the weakness revealed by the budget, either as a certainty or as a possibility will be remedied by using any one or all three of the following ways of adding flexibility to the cash position:

- a. By improving the timing of operations
- b. By increasing the receipts
- c. By decreasing the expenditures.

It is obvious that, whatever the method of action followed, any step taken will be greatly facilitated by the mere fact that the budget has given an advance warning of the threatening cash shortage.

(a). *Timing of operations.* If the budget reveals that the cash position is reasonably easy during the major part of the year but dangerous during a given period, the remedy should at first be sought by *changing the timing of cash operations*. The usual process will be to postpone some expenditures, for instance, by obtaining creditors' agreement for extending notes or by deferring the payment of supplies. It may also be possible to request prompt payment from some debtors.

(b). Should such rearrangements be impossible, undesirable, or insufficient, an attempt will be made to *increase the cash receipts*. The usual process will be to obtain some short-term financing from a bank by issuing notes or applying for a loan. The temporary mortgaging of inventory (raw materials or finished goods) or a loan on receivables may also be considered.

(c). As a last resource, *cash expenditures must be reduced* during the period for which a cash shortage is forecasted.

Essentially, if large amounts of cash are involved, this may mean:

- A reduction in production, selling, or administrative expense
- A reduction in capital expenditures
- A reduction in the material-purchase program.

The reduction in production, selling, or administrative expense involves a budgetary adjustment. It was considered in Chapter X.

The reduction in capital expenditures involves a revision of the long-range development program. Reference is made to the following chapter especially page 237 et seq.

The reduction in the material-purchase program calls for some additional explanations.

*Material-Purchase Program.*

Reference was already made to the close relationship existing between the material-purchase program and the cash budget. The expense involved in fulfilling the material-purchase program should be clearly distinguished from the direct-material expense, the budgeting of which was considered in Chapter VII. (See above, page 129 et seq.)

The direct-material expense is the cost (generally valued at standard cost) of the raw material used for the fulfilment of the production budget.

The material-purchase program expense is the cost of the material actually purchased during the year.

Although the production budget and its material requirements are in final analysis the reason for any material purchase by a manufacturing concern, it is a fact that many factors other than strict production considerations will influence the material-purchase program.

The market situation may be of great importance: if the prices are low, the policy of the business may be to buy in excess of actual needs in prevision of a probable future increase. The opposite policy may be followed if the contrary is true. The business may also, as is often the case, deliberately refrain from taking such a speculative position. In this case, the purchasing of raw material may be compensated by the future selling on the commodity market of an equivalent quantity of raw material. This operation ("hedging") protects the business against possible loss from market fluctuations. It also means giving up the chance of speculative gains resulting from such fluctuations.

Whatever the importance of such factors as the above, whatever the line of policy followed by the business, it is a fact that the purchasing program always involves a substantial expense and is, as such, of primary concern to the cash budgeter.

Cost of material may represent 40 percent or more of the sales dollar in the manufacturing industry [F.T.C.]. This figure gives an idea of the order of magnitude of the financial problem involved in the purchasing of, let us say, a three-months' supply of raw material.

In fact, the material-purchase program cannot be established without considering first the cash problem involved. Furthermore, and this is why the program is considered at this point, the cash budgeter will find there one of the most decisive elements of flexibility in cash budgeting.

By delaying the purchase of raw material, even at the risk of increasing the ultimate cost; or by mortgaging the raw-material inventory; or by using various available procedures for financing the purchase (such

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as letters of credit for instance) the business will find a substantial reservoir of cash in case of need. The cost of material, expressed in percent of the sales dollar, indicates for each product and in each business to what extent the material-purchase program may be considered as an element of flexibility in cash budgeting.

#### IV. THE PROCEDURE AND PRESENTATION OF THE CASH BUDGET

Being the executive primarily concerned with the cash situation, the treasurer should be closely associated with the preparation of the cash budget. Similarly, in previous chapters, it was found that the sales manager should be closely associated with the preparation of the sales budget, the production executives with the production budget, etc.

It was also found that in sales budgeting, production budgeting, etc. there was a need for a general cooperation of other operating executives not directly concerned and a need for the coordination of all these efforts under the direction of a specialist, the budgeter.

The procedure to be followed in cash budgeting is a similar one, illustrating once more the fundamental unity of the various activities conducted within a business organization.

The treasurer is the executive more specifically in charge of cash problems; but he also needs the help and cooperation of most if not all the other executives and their common effort should be directed and coordinated by the budgeter.

For instance: The sales manager will advise as to the scheduling of important selling expense (advertising campaign, traveling, etc.); the head of the credit department will provide data concerning the probable collection of accounts; the head of the purchasing department will indicate the requirements of the purchasing program and at the same time be kept informed of the cash situation which, as previously seen, may impose changes in the material-purchase program; the chief engineer will be consulted with regard to equipment expenditures; the maintenance department with regard to repair and maintenance programs.

In short, every executive who is in a position to forecast or to influence cash receipt and cash disbursement should be consulted.

The details of the budgetary procedure should be adjusted to the need of a given organization. As a general rule, it may be said that, in the case of the cash budget, as of any other budget, the final estimate will result from the collaboration of three classes of executives:

1. The executives responsible for the preparation of the budget; i.e. the budgeter (who usually is also the controller) and his assistants.

One of the assistants may be advantageously specialized in cash budgeting if the size of the organization warrants such a specialization.

2. The executives in charge of the actual performance within the frame of the budget; in this case the treasurer and his assistants.

3. The executives whose advice is needed in the preparation of the budget and whose actions may influence its actual execution; in this case, most of the department heads but especially the sales manager, the credit manager, the production manager, and the head of the purchasing department.

As usual, the procedure will provide not only for formal meetings at the time the cash budget is being prepared but also for periodical meetings and for informal contacts during the year. The time element is so important in cash budgeting that each executive should be made fully conscious of the need for reporting immediately to the treasurer and the budgeter's office any decision, fact, or information related to future cash receipt or disbursement. Such are, for instance: changes in the scheduling of sales promotion, advertising campaign, etc.; information pertaining to a debtor's standing; difficulty in collecting accounts; requirements for urgent equipment repair, etc.

Materially, the cash-budget estimates will be presented in a form showing their break-down period by period, which emphasizes the great importance of the time factor. It is advisable to provide for an easy comparison between estimates and performance in terms of actual cash receipt and disbursement.

Each business having its own requirement, no standard form can be given in advance. It is only as an illustration of the principles involved that a form actually used for the purpose of cash budgeting in a given business is reproduced in Figure 45.

The first column of the form is self-explanatory. Reference is made to the details given in the text (page 217 et seq.) with regard to the items listed and the classification followed.

The following columns give for each item listed in column 1:

The budgeted figure

The actual receipt or disbursement

The difference (over or under) between budget and actual, expressed in dollars and cents

The same difference expressed in percents of the budgeted figure.

Such figures are given for the period under consideration (one week, two weeks, or a month) and also cumulative since the beginning of the fiscal year, as shown in Figure 45.

ABC COMPANY  
CASH RECEIPTS AND DISBURSEMENTS

Period from                      to                      195..  
and cumulative since Jan. 1,

	For the Period				Cumulative			
	BUDGET	ACTUAL	$\frac{O}{U}$	%	BUDGET	ACTUAL	$\frac{O}{U}$	%
<i>Definite Receipts</i>								
Notes receivable collection								
Accounts receivable collection								
Cash sales								
Property rental								
Dividends received								
Others								
TOTAL								
<i>Definite Disbursement</i>								
Payroll								
Notes payable								
Superintendents' salaries								
Salesmen's salaries								
Executives' salaries								
Material purchased-payment								
Factory expense-payment								
Selling expense-payment								
Administrative expense-payment								
License fees								
Taxes								
Interest								
Others								
TOTAL								
Definite cash increase or decrease								
Cash on hand								
Balance								
<i>Probable and Optional Receipts</i>								
Additional collections								
Cash discount taken								
Sales of security								
Others								
TOTAL								

PROPERTY OF  
CARNEGIE INSTITUTE OF TECHNOLOGY  
LIBRARY

*Probable and Optional disbursements*  
Material purchased-payment  
Factory expense-payment  
Selling expense-payment  
Administrative expense-payment  
Investments  
Transfers  
Others  
TOTAL  
Probable and optional cash increase or decrease

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FINAL BALANCE

Figure 45. Form for Cash Budgeting

## ■ XIII

### CAPITAL EXPENDITURES, MAJOR REPAIRS AND RESEARCH BUDGET

**T**HE HEADING of this chapter, instead of reading as above, might just as well be: Budgeting of those incomes and expenses that are not accounted for in the Profit-and-Loss statement.

All the incomes and expenses considered in the previous chapters (sales income, manufacturing, selling and administrative expenses) are, on the contrary, the elements of the Profit-and-Loss statement.

Such a difference is not merely due to accounting technique. It reveals fundamental characteristics of the capital expenditure, major repairs and research expense, which will now be considered in relation to the sources of income they may require or originate.

#### A. DEFINITIONS

The budget of capital expenditures includes additions, betterments, and replacements to plant and equipment. It does not include the current-repairs budget. Some organizations group together the capital

expenditures with the current-repair budget and use the term "plant and equipment budget." Such a method is not advisable, because it does not take into account the fundamental distinction between capital expenditure that should be depreciated over a period of years and those expenses that are, as a rule, a charge to the current fiscal year and should be budgeted as part of the manufacturing expense.

Some repairs, however, are of such a magnitude that they should not be treated as current expense. They would abnormally unbalance the profit-and-loss equilibrium and furthermore should not be treated as such because their beneficial effect will be felt over a period of years. These considerations justify their being handled outside of the manufacturing-expense budget. It is, however, recommended for a better and clearer understanding to separate them also from the capital-expenditure budget, strictly speaking, as previously defined, and to group them in a "major-repairs budget."

The distinction between major and current repairs is a matter of common sense and accounting honesty. It does not lend itself to a rigid definition and is often open to controversy, especially when tax problems are involved. For instance, the re-cementing of the entire floor of a plant is considered by the tax administration as a major repair. The expense must be amortized over a long period of years, based on the useful life of the cement covering. If the same work is done piecemeal, in a few years, each job is a current repair that can be deducted from the yearly profit as a manufacturing expense.

The capital expenditures for additions, betterments, and replacement are generally such that, contrary to the major repairs, there cannot be any doubt as to their true nature. Such are, for instance, the purchase of a building, of machinery, of plant expansion, etc. It is generally agreed that such accessory expense as incoming freight for the equipment, expense for preliminary investigation, etc., are also part of the capital expenditure involved. There are however some borderline cases. For instance: is the unabsorbed burden of a new plant that operates at an abnormally low rate of production a capital expenditure or a manufacturing expense? The question is a controversial one, independently from any consideration of tax reduction.

Similar and even more delicate questions arise if one attempts to define a capital-research budget (considered as of the same nature as a capital expenditure) as compared to a current-research expense (part of manufacturing expense).

Here again, tax considerations may influence the decision and be an obstacle to a clear and logical accounting procedure.

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Current research, undertaken year in, year out, to improve production and reduce costs is a current manufacturing expense.

A research undertaken in a given organization either for a definite purpose, such as the creation of an entirely new product or a radical change in a process of manufacture, or just for the sake of pure research, with the hope of future but yet undetermined improvement, is of a different character. Logically the expense involved in the latter case should not be considered as a manufacturing expense. Obvious reasons may again influence the decision, especially if the personnel in charge and the equipment used are identical in both cases.

The reader should therefore be aware that a good definition of capital expenditure, major repair, or capital research is necessarily flexible and that furthermore, a great flexibility exists in the actual application of the principles involved.

This being said, there are in theory and in practice, capital-expenditure, major-repair, and capital-research budgets. The general principles of budgeting involved are fundamentally different from the ones previously described for current expenditures and incomes, as will now be shown [Hertz, 1950, IX].

#### B. ESSENTIAL CHARACTERISTICS OF A CAPITAL BUDGET

Perhaps the most significant characteristic of such capital-expenditure budgets is that each project constitutes a distinct venture that is considered for itself in each of its elements (expense, income, gain, degree of urgency, etc.).

The purchase of this or that equipment, the major repair of this or that machine, the beginning of this or that research are, each of them, a special project. There are generally as many budgets as there are special projects. Each of these special budgets should provide for its expenditures and also for its income.

The income will generally result from an advance made to the project considered as an accounting entity by the business as a whole. The cash may originate either from the reserves of the business or the current profit or from a loan specifically contracted for the purpose.

Before a final decision is taken, management should be in a position to appreciate:

1. The total expenditure involved
2. The possible source of income or funds to cover such expenditures
3. The ultimate gain that will probably result from the project

4. The period of amortization and its effect on future current expense.

Thus, the budgeter will recognize the need for four distinct phases in capital-outlay budgeting, which will now be described.

#### C. THE FOUR PHASES IN CAPITAL OUTLAY BUDGETING

1. Project approval
2. Estimate approval
3. Authorization of the project
4. Follow-up.

##### 1. *Project approval*

Very generally, the mere estimate of a capital outlay, if it is to be reliable, requires time, effort, and preliminary expenses. Therefore, the first step is to submit for consideration by the proper authorities a proposal of the project itself. A very approximate estimate may be given at this time, together with the motives for considering the project at all. This approximate estimate will not always be available. For instance, there may be no way to know with any reasonable degree of approximation the cost of a research project. In some cases, it is desirable to obtain an estimate of the cost involved in having the project estimate prepared by a specialist (for instance: architect and engineer fees involved in the planning of a new plant). In most cases, it will be possible to secure an adequate first estimate by simply inquiring from the eventual supplier (plant builder, equipment manufacturer, etc.).

##### 2. *Estimate approval*

The final estimate should be based on definite and reliable figures. If the capital outlay involves the replacement of existing equipment or the choice between two or more possibilities, the relative value of the alternatives should be clearly shown [*Eco. Ind. Mgmt.*, XIII; detailed methods of analyses, Terborgh, 1949].

If a research is involved, the probable or possible gain is to be shown as accurately as possible. If a major repair is considered, its cost should also be compared to the cost of replacing the equipment, due account being taken of the effects on maintenance cost.

The estimate approval by management indicates approval of the project as a matter of principle. It does *not* imply authorization to proceed. The fundamental reason is that there is a gap between a sound idea and the possibility of realizing it.

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### 3. *Authorization of the project*

This gap is bridged by the authorization given to proceed. Such an authorization involves a determination of the ways and means to finance the project (by loan or by using reserves, etc.). The relationship to the cash budget is obvious. If the project is actually a succession of individual projects, a partial authorization may be given. It is sometimes a dangerous procedure as it may create a *fait accompli* with respect to the other parts of the project. Management, later on, may be more or less forced to authorize them, lest the benefit of the first efforts made be entirely or partially lost.

If a substantial period of time elapses between Phase 2 (approval of estimates) and Phase 3 (authorization of the project) it will be a good policy to revise the original estimates.

The authority responsible for approval of the estimate or authorization of the project varies with the size of the project and the traditions of the organization. As a rule, any capital outlay of some importance requires approval by the board of directors and unless its authority has been formally delegated, it should always be consulted on such matters.

### 4. *Follow-up*

The follow-up serves a double purpose:

- a. It should keep management informed of the progress of the work and of the conformity of actual execution with the budget.

The following procedure is used on this point in a given organization (an oil company) which has, during the last ten years, engaged in extensive improvement programs, involving very substantial capital expenditures:

Charges to each project are accumulated on job cost sheets by the plant property section. When it becomes evident that a job will be overrun, a supplementary request must be submitted beforehand showing complete details concerning the extent and reason therefor. Such requests must be approved by the same level of management who approved the original request. Underruns below a certain percentage of the amount originally approved must also be covered to explain why authorizations were not fully spent.

In this connection one cardinal rule might be emphasized, and that is that unexpended balances remaining at the close of a project cannot be expended on another project by transfer or otherwise. To permit such a practice would serve to defeat the purpose of the procedure which is to control each individual job in relation to the amounts authorized or budgeted.

TABLE XIX  
EXPENDITURES ON NEW PLANT AND  
1941-1950 <sup>2</sup>  
(Millions of dollars)

	1941	1942	1943	1944	1945	1946
Manufacturing	3400	2760	2250	2390	3210	5910
Mining	680	410	360	500	440	560
Railroad	560	540	460	580	550	570
Other transportation	340	260	190	280	320	660
Electric and gas utilities	710	680	540	490	630	1040
Commercial and misc. <sup>4</sup>	2490	1470	730	970	1480	3300
Total	8190	6110	4530	5210	6630	12040

<sup>1</sup> Excludes agriculture; figures represent estimates of actual expenditures except where indicated to be anticipated expenditures.

<sup>2</sup> Figures for 1941-1944 are Federal Reserve Board estimates based on Securities and Exchange Commission and other data. These figures do not agree precisely with the total included in the gross national product estimates of the Department of Commerce. The main difference lies in the inclusion in Commerce figures of certain outlays charged to current account.

The work required in connection with the preparation of appropriation requests, the maintenance of job cost sheets and the submission of the various status reports described above are handled by the plant property sections at each plant, who are also responsible for the maintenance of all property, plant and equipment records. The budget section at the home office is largely interested in the divisional and consolidated summaries which are used for corporate planning and control purposes. [McFayden, 1949]

Such a procedure clearly illustrates the principles previously developed. The cardinal rule, that unexpended balances remaining at the close of a project cannot be expended on another project by transfer or otherwise cannot be too much emphasized. If it is not strictly and even rigidly enforced, there is no justification for capital expenditure budgeting.

b. At a later date the follow-up procedure should, if the production lends itself to such a presentation, show management the ultimate gain made through the project. For instance, if a new equipment has been bought, the budgeter will present a comparative statement showing the actual cost of production with the new equipment, as compared to what it was previously. If a research project has been undertaken, any saving realized through the research work should be shown as a credit to the "project," considered as an accounting entity; which is debited with the amount of capital expenditure. It should be clear that

TABLE XIX  
EQUIPMENT BY UNITED STATES BUSINESS <sup>1</sup>

1941-1950 <sup>2</sup>  
(Millions of dollars)

1947	1948	1949 <sup>3</sup>	1949				1950
			Jan.- Mar.	Apr.- June	July- Sept.	Oct.- Dec. <sup>3</sup>	Jan. <sup>3</sup> - March
7460	8340	7130	1850	1880	1690	1710	1520
690	800	730	190	190	180	170	160
910	1320	1340	360	380	310	290	220
800	700	510	130	140	130	110	80
1900	2680	3160	680	780	790	900	740
4430	5390	5040	1260	1290	1260	1250	1110
16180	19230	17910	4460	4660	4360	4430	3820

<sup>3</sup> Estimates based on anticipated capital expenditures of business.

<sup>4</sup> Includes trade, service, finance, communication, etc.

NOTE: Figures are rounded and will not necessarily add to totals.  
Source: Security and Exchange Commission.

such presentations are in the form of accounting analysis and not included in the books of accounting.

In the case of the company previously taken as an example, it is the rule to establish a semiannual savings report comparing actual savings with estimated savings on each request approved to accomplish economies in operation and which have been in operation for one year or more.

#### D. THE FIVE-YEAR DEVELOPMENT AND IMPROVEMENT BUDGET

Table XIX indicates the magnitude of the capital expenditures on new plant and equipment by United States business. (These figures do not include the expense for such other capital outlays as research or major repairs.)

To be fully understood, such figures should be compared to a standard that will give an idea of their magnitude. The reader has the choice among such standards as gross national product, national income, sales by industries, etc., that are currently available [*Fed. Res. Bull.; Survey Cur. Bus.*].

To give a precise idea of the order of magnitude of the capital expenditure in a given case, the following figures and statements are submitted [Ludt, 1949].

During the 14-year period 1934-1947, the thirty major U. S. Oil Companies made capital expenditures amounting to \$12,710 million for domestic and foreign facilities. During the same 14-year period, these oil companies generated through their operations \$12,605 million in liquid funds, or slightly less than the amount of funds required for capital expansion.

These figures make no allowance for dividends to shareholders and increases in working capital.

During the year 1947, these companies created \$2,903 million of liquid funds, of which 74% was derived from earnings, 24% from the issuance of long-term debt and stock, and 2% from assets and other transactions. Of this total amount of \$2,903 million, \$2,076 million, or 72%, was used for capital expenditures. This amounted to an average capital expenditure of \$4,000 per employee.

The preceding figures give some idea of the tremendous sums of money being spent for investment. Tables XX and XXI illustrate the problem concisely.

TABLE XX  
GROSS EXPENDITURES FOR PROPERTY, PLANT AND  
EQUIPMENT OF 30 OIL COMPANIES CLASSIFIED  
By DEPARTMENTS FOR THE YEAR 1947

	<i>Domestic and Foreign</i> (Millions of dollars)	<i>Percentage</i>
<i>Producing Department</i>		
Leases, wells, and equipment	1026	
Natural gasoline plants	41	
Crude oil marketing	1	
Natural gas	9	
Total producing	1077	52
<i>Transportation Department</i>		
Crude oil pipe-lines	137	
Product pipe-lines	29	
Marine	120	
Tank cars	1	
Motor transport	10	
	297	14
<i>Refining Department</i>	402	20
<i>Marketing Department</i>	277	13
<i>Others</i>	23	1
Total all departments	2076	100

TABLE XXI  
COMBINED STATEMENT OF SOURCE AND DISPOSITION  
OF WORKING CAPITAL OF 30 OIL COMPANIES  
FOR THE YEAR 1947

	<i>Millions of Dollars</i>	<i>Percentage</i>
<i>Source of Funds:</i>		
Provided by earnings	2160	74
Long-term debt issued	476	17
Preferred and common stock issued	206	7
Sale of fixed assets and other transactions (net)	61	2
Total funds provided	2903	100
<i>Disposition of Funds:</i>		
Capital expenditures	2076	72
Dividends paid to companies' shareholders	425	14
Dividends paid to minority interests	30	1
Long-term debt refunded	135	5
Long-term debt retired	62	2
Preferred stock redeemed	—	—
Total funds disposed	2728	94
<i>Increase in working capital</i>	175	6

Such comments and statistics explain why particular attention has been lately given by industry to the vital problem of organizing a proper procedure to forecast, prepare, facilitate, and closely control capital expenditures.

This procedure generally takes the form of a five-year development and improvement program, revised year after year to adjust the provisions to changes in the needs or the financial possibilities of the business and to changes in market and economic conditions.

The existence of such a comprehensive document as this five-year budget should not create any misunderstanding as to the true nature of a capital-outlay budget. Within this comprehensive program, each project keeps its own individuality and, although it may be closely related to the other projects, it must be considered as one entity. This means essentially that the funds are *not* transferable within the budget and that an excess of appropriation related to any project *cannot* be used for any other purpose even within the development program.

The five-year development program is often broken down in yearly programs, each yearly program becoming thus a capital-outlay budget for itself.

In any case, the budget is fundamentally an approval of the estimate and *not* an authorization to proceed (for this distinction, see above, page 234 et seq.).

It is always the rule to consider the budget as a flexible forecast, subject to revision. This is one more fundamental difference from the production-expense budget which has a much more definite character.

In most businesses, the revisions of the five-year program are undertaken periodically, at regular intervals (a year or six months for instance). In some businesses a more flexible rule is followed, which the authors consider as most advisable, namely the rule that the budget is revised at irregular intervals at the request and only at the request of the executive responsible for a given project. Under such a rule, each executive is held responsible for the maintained accuracy of the forecast related to his division unless he requests in due time a revision of this forecast.

#### PROCEDURE

Practically every manufacturing enterprise anticipating its needs for funds during the next budget period, finds that among these needs are those for major repairs and alterations of buildings, expansion of the power plant, the purchase of new manufacturing equipment, trucks, and many other items. Normal repairs and maintenance expenses are included in the budget of Factory Expense. Expenditures for the capital account are in the nature of investments. Such expenditures should be planned for as to amount, order of importance, and timing in relation to anticipated available funds. The preparation of such a budget should begin by the budget officer requesting, of the appropriate departmental heads, their recommendations as to major repairs, replacements, new equipments, and other items requiring capital expenditures.

It is helpful for purposes of tabulation that the request be accompanied by a Mimeograph form for the systematic recording of the items and particulars of each capital expense proposal.

The items of the proposal for new machinery and equipment should in general include the following:

1. Type of machinery and equipment
  2. Supplies
  3. Purchase price
-

4. Time required for delivery after placement of order
5. Installation expenses (materials and labor)
6. Time required for installation
7. Reasons for proposal
  - (a) Replacement
    - (1) Mechanical obsolescence
    - (2) Economic obsolescence
  - (b) Expansion
  - (c) Economic justification.

The economic justification should state the estimated savings in costs of operation and the estimated period of capital recovery.

The proposal for major repairs, plant extensions, and new construction should state:

1. Major specifications of construction
2. Estimated costs
  - Materials
  - Labor
  - Total
3. Time required
4. Estimated disbursements by months
5. Reasons for proposal and economic justification.

These general items of proposal may be expanded or altered as the needs of each type of business may require. Requests for proposals should be made well in advance of the time for assembling the budget figures, not only that they may be available at the time of preparation of the budget but also that major items may be considered by the directors for authorization prior to the final adoption of the budget. The total of all these proposals should then be reviewed with regard to the possibility of their inclusion in the budget, for modifications indicated by possible limitations of available funds, and for timing. Frequent conferences are often required on some proposals before their final form is acceptable to the management. The placement in time of the items of capital expenditure in the budget will depend, among other things, on the company's own reserves of funds available for such expenditures, on the bank borrowing possible, and on the company's working-capital requirements throughout the year. The budgeting officer must be guided by all these considerations as he attempts to fit the several capital expenditures into the budget.

Precisely because of their magnitude, capital expenses should be

\_\_\_\_\_  
CORPORATION  
ESTIMATE OF CASH RECEIPTS  
AND DISBURSEMENTS  
1949

	<i>Total</i>	<i>January</i>	<i>February</i>	<i>March</i>	<i>April</i>
1. Receipts	\$2,567,654	207,834	200,663	205,778	200,672
2. Disbursements					
(a) Expense for Operations	2,174,127	192,258	178,429	165,319	159,006
(b) Capital Expenses	86,388	13,664	15,514	16,414	13,364
(c) Totals	2,260,515	205,922	193,943	181,733	172,370
3. Cash on hand					
1st of month		180,000	181,912	188,632	212,677
4. Additional Receipts		207,834	200,663	205,778	200,672
5. Total Available		387,834	382,575	394,410	413,349
6. Disbursements		205,922	193,943	181,733	172,370
7. Cash on hand					
end of month		181,912	188,632	212,677	240,979

Figure 46. Capital Expense Budgeting in Relation to Cash

closely studied in their relationship to the availability of funds. In one situation with which the writers were associated, one of the objectives in budgeting for a particular year was gradually to build up the cash reserves. The reason for this objective need not be considered. The management fitted its capital expenditures to the other items of the budget, so that the cash position of the company was improved each month, as the condensed statement in Figure 46 will illustrate.

Each item of authorized capital expenditure was reported monthly by the department head authorized to make the expenditure by the use of an appropriate form. The plant engineer, for example, reported on his expenditures for building and installing an aerator and cooling coil on the form shown in Figure 47, reproduced from the company's files.

The major repairs should also be budgeted as to amounts and times to be made. These are sometimes included in the schedule of general repairs for the purpose of consolidating all items of budgeted expense for repairs of all kinds, but this procedure is not advisable. The amounts of each item of repair are estimated by the plant engineer for the use of the budgeting officer. Their placement in time in the budget depends largely on the urgency of the repairs.



CORPORATION  
ESTIMATE OF CASH RECEIPTS  
AND DISBURSEMENTS  
1949

<i>May</i>	<i>June</i>	<i>July</i>	<i>August</i>	<i>September</i>	<i>October</i>	<i>November</i>	<i>December</i>
212,948	202,718	207,833	210,903	218,065	233,410	230,341	236,489
180,290	164,220	162,197	166,587	163,616	193,141	220,760	228,304
8,304	9,454	1,104	1,954	1,604	2,454	1,104	1,454
188,594	173,674	163,301	168,541	165,220	195,595	221,864	229,758
240,979	265,333	294,377	338,909	381,271	434,116	471,931	480,408
212,948	202,718	207,833	210,903	218,065	233,410	230,341	236,489
453,927	468,051	502,210	549,812	599,336	667,526	702,272	716,897
188,594	173,674	163,301	168,541	165,220	195,595	221,864	229,758
265,333	294,377	338,909	381,271	434,116	471,931	480,408	487,139

Figure 46. Capital Expense Budgeting in Relation to Cash

The form on which plant-repair items are scheduled in the budget is illustrated in Figure 48. The general repairs required for maintaining the machinery and buildings in good operating condition are scheduled at an average monthly rate as noted in Figure 44.

The forms and schedule in Figures 46, 47, and 48 refer to a particular year, but were actually in part related to a five-year program.

#### THE CHOICE OF IBM MACHINERY

There is a definite tendency in industry today to substitute mechanical accounting procedures for the traditional methods. Sometimes it is possible to compare the rental cost of the required machinery to the saving in clerical help. Generally, however, the comparison is just impossible, because the detailed information resulting from the use of such machinery is incomparably more valuable than the one gained by applying conventional methods of analysis. Yet a decision must be taken on a basis as rational as possible.

Very recently, the authors had occasion to advise a business in the following circumstances.

This business sells about 400 different items to thousands of customers at five different selling prices (retailers, jobbers, chain, depart-

## BUDGETARY CONTROL

## CAPITAL EXPENDITURES

Description:						Auth. No. 1137	
						Date	
Aerator & Cooling Coil						D 3	
						Amount Authorized \$3,000.00	
Details of Expenditures							
Description	Month of January	Month of February	Month of March	Month of	Month of	Month of	TOTAL
MATERIALS	2 18	10189	266406				276813
LABOR:							
Blacksmiths							
Carpenters							
Carpenters' Helpers							
Coppersmiths							
Cop'smiths' Helpers							
Electricians							
Electricians' Help.							
Engineers							
Machinists							
Machinists' Helpers							
Pipefitters		5512					5512
Pipef'ers' Helpers		3920					3920
General		4474					4474
TOTAL LABOR		13906					13906
TOTAL MAT. & LABOR	2 18	24095	266406				290719
S U M M A R Y				REMARKS:			
Amt. Originally Authorized	3000 00						
Additional Authorization							
TOTAL AUTHORIZED	3000 00						
Expenditures							
Material	2768 13						
Labor	139 06						
TOTAL EXPENDITURES	2907 19						
Over-Expended							
Under-Expended	92 81						

Figure 47. A Form for Report on Capital Expense Appropriations

\_\_\_\_ CORPORATION  
ESTIMATE OF PLANT REPAIRS  
BUDGET  
1949

	Total	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
R.R. Track													
Scale	800	800											
Boiler No. 1	850	400	450										
Boiler No. 3	1,110				500	600							
Feed Dryers	700			700									
Air Comp.													
Valves	200	50	50					50	50				
Store Room													
Floor	1,500		500	500	500								
Heating Coils	3,250	300	300	300	300	300	300	300	300	300	300	250	
Presses	400				100	100	100	100					
Wet Feed													
Conveyor	200			200									
Staves, etc.	300	50	50	50				50	50	50			
Painting	1,500			250	250	500	500						
Office Floor	300	300											
General	52,900	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,400	4,500
Total Repairs	64,000	6,300	5,750	6,400	6,050	5,900	5,300	4,900	4,800	4,750	4,700	4,650	4,500

Figure 48. A Form for Estimating the Plant Repairs Budget

ment stores, and export). Thus arises a vital problem of sales mixture (see above, page 156 et seq.).

No control of the sales mixture had been previously attempted. A detailed analysis never before undertaken by the company revealed that some salesmen were selling up to 8 percent of their total sales on a non-profitable basis or at a loss while others were selling the most profitable items in a high proportion.

The business uses the following IBM machinery at the following monthly rental cost:

Tabulator	\$215
Sorter	40
Gang punch	65
2 key punches	50
Verifier	13
Multiplying punch	150
Total	<u>\$533</u>

A study of the procedure required for the establishment of an effective sales-mixture control, revealed the need for the following additional IBM machinery at the following monthly rental cost:

Collator	\$ 80
Additional tabulator	270
No. 602A multiplier	245
Reproducer	85
	<u>\$680</u>

The new machinery would however replace

The multiplying punch	\$150
The gang punch	65
	<u>\$215</u>

resulting ultimately in a monthly rental increase of only

	\$680
less	<u>215</u>
	\$465

or \$5,580 per year.

Together with excise tax, power expense, card expense, and the need for one additional operator, it was estimated that the additional expense involved was about \$7,500 a year.

Was the more precise information obtained on the sales mixture worth that amount or not? On the basis of a net profit of 10 percent of sales, it would require somewhat more than \$100,000 additional sales to compensate for such an additional expense (after federal income tax of 38 percent of the net profit). This approach to the problem at first obviously commanded a rejection of the proposal.

Another approach was then suggested. The business is making about \$5,000,000 yearly sales. If an improvement in sales-mixture control has any meaning at all, it should result in a higher proportion of sales of the more profitable items. Should it not, even without any increase in total sales, result in an increase of, let us say, one half of one percent on the average profit per dollar of sales? (On \$5,000,000 of sales.)

At the time this book is written, the decision is still pending. This example is given to illustrate how difficult it is sometimes to determine whether or not a capital expenditure is advisable.

#### CONCLUSION

Because of the magnitude of the amount of money involved in capital outlays, the capital-expenditure, major-repairs, and capital-research budgets have certain characteristics of their own.

The expense and the income involved do not figure in the profit-and-loss statement. Yet their relationship with the other budgets is very close. Profits, reserves, and other sources of funds available are in final analysis the important factors in deciding about capital outlays. Furthermore, precisely because of the magnitude of the sums involved, the capital budgets cannot be separated from the cash budget.

Another characteristic is the very strong individuality of each project. Funds and appropriations are not transferable from one project to another. Yet, there is generally a close relationship and interdependence among the various individual projects. The trend of industry today is therefore to relate these projects by including them in an over-all five-year development program subject to periodical revisions.

Such a program serves many purposes:

*Psychologically*, it creates among the executives a sense of responsibility and a sense of continuity.

*Financially*, it helps management in establishing long-range financial programs for use of reserves, issuance of stocks or bonds, borrowing policy. It also constitutes an element in the decision of the lender (bank, individual, or insurance company) whose confidence is always enhanced by the presentation of a logical and well-balanced long-range program.

*Technically*, such a long-range program of planning avoids hasty and

half-hazardous decisions. It is and should be very flexible, precisely because of its long range. Even when changes occur, it keeps its full value, because adjustments can be made without destroying its frame. In case of adjustments they are always considered as variations in plus or minus from the program taken as a basis. Thus, the program appears as a stable line of central tendency, yet not as a rigid frame. As every budget should be, the capital-outlay budget is an adaptable and friendly guide to management.

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## ■XIV

### HOW TO INTRODUCE BUDGETARY CONTROL

**B**UDGETED BUSINESSES today are still in the minority. There is, however, a definite trend toward the introduction of budgetary control. Although precise data are not available, there are reasons to believe that a great number of organizations have recently introduced or are now considering the introduction of such a control. Recent developments in our economy, as noted below, are stimulating the trend toward more budgeting.

It is a fact, for instance, that, more and more, long-range financing is the result of a direct deal between an insurance company and a given business, rather than the result of bond selling to the public through investment bankers as was traditionally the case in the past. It is also a fact that an insurance company [Met. Life Ins. Co., 1937] is likely to give less weight than the public would to the appearance factors, such as a good profit shown by the books, or a successful advertising campaign, etc., and much more weight to good management based on effective budgetary control.

The system of high federal taxes, that has now been in existence for almost ten years and the end of which is not in sight, also plays its part. In the past, the high profits made in good years would enable a business to accumulate substantial reserves on which to live during a difficult period. Today, 38 percent of such profits are sent by the corporation to the tax collector. Furthermore, there are limits above which reserves are not permitted to grow, even if the business can eventually acquire them. They must be distributed to the shareholders or reinvested.

In short: Compensating the low profit of the bad years by the high profit of the good years is an expensive proposition, even within the limits within which it is still at all practical.

Stabilization of profits within reasonable limits of variation instead of the formerly attempted "killing" is, or should be, the goal of modern business. This implies budgetary control.

For these and similar reasons, it can be safely assumed that the introduction of budgetary control will be more and more favored in the years to come. This is why some attention will now be given to this problem.

The reader is certainly aware that it is impossible to give precise rules and instructions that could be applied as such. This chapter merely purports to develop certain guiding principles suggested by experience.

#### A. PSYCHOLOGICAL FACTORS

The current experience of anyone who suggests the budgeting of a given business is to draw the answer: "Yes. This is indeed fine but it is not practical for us."

It is true that some businesses cannot be budgeted, or at least that their budgeting would meet with such difficulties that it is not advisable to consider it. This is the case in businesses where sales variations are absolutely unpredictable. (For example, some businesses in the fashion industry.) Such cases, however, are very exceptional. As a matter of experience, the sales of most businesses can be predicted between reasonable limits of accuracy sufficiently narrow to permit budgeting. The experience of so many companies in so many different fields of activities that today use a budget is very significant. Reference is made on this point to a recent survey made by the National Industrial Conference Board (Business Record, Vol. V, No. 11). The statement that "it is not practical for us" should therefore, as a rule, be considered as a natural and common reluctance to change. The first step will be to

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overcome this attitude by showing the beneficial effects obtained in similar businesses by the use of budgetary control.

The second step is to show why and how this fine procedure could also be applied "just here." Any reader who has demonstrated his consistency of purpose by reading to this book's ultimate chapter can certainly be trusted to give the best adapted and most convincing argument to win the point. It can therefore be safely assumed that this second step will eventually be taken.

The third step, which will now be fully studied, is to prepare the psychological climate in which budgeting will successfully develop.

Psychological factors are always important in management; they are especially vital in budgeting because the beneficial effects of budgeting can only be felt after the procedure has been in force for some time and very honestly applied by everyone. This implies that the budgeter to be successful must, first, enjoy the confidence of management at all levels, and that he must enjoy it for a substantial period of time before being asked to show the benefits of his endeavor.

What is meant by "a substantial period of time" may vary. Actually, it will be safe not to expect that budgetary control can be firmly established before about two years after the work has started.

This does not mean that not any beneficial effect will be felt by the business before the two years are over. (In fact, experience shows that merely explaining the principles of budgeting to the staff and organizing their cooperation toward such a common goal is in itself stimulating a team spirit within the organization.) It means only that at least two years are needed to realize fully the value of budgeting; but, month after month and year after year, more and more obviously, the procedure will show what it can do for the business. This should also be emphasized, lest management be discouraged by the prospect of too long a waiting period.

Other psychological obstacles result from the natural reluctance of human beings to accept changes in their habits. As usual, in any reorganization procedure, the budgeter will take great care in explaining the reasons for the change and, above all, in clearly showing that the change is not endangering anyone's position.

Such negative factors might threaten the whole project and should be fully recognized and taken care of. It is then possible to devote one's full attention to more positive factors: obtaining the wholehearted support of the staff, organizing cooperation among the executives, and demonstrating to management how to use the tool that is being developed.

Another danger is to overreach the goal. After painstaking efforts to convince management of the value of budgeting, one may find that a situation develops in which the budget becomes a sort of dominating and irresistible divinity. A fatalistic attitude is thus created which may be highly detrimental to the business.

To illustrate the danger involved, the authors quote a letter very recently received from the budgeter of a large corporation. It reads in part as follows:

I am trying to say that we can prepare a budget as we did for one of our affiliated companies last year, which budget forecasted a loss of \$240,000 and there resulted an actual loss of \$250,000. The sales, costs, expenses, etc. were all in line with the budget. Accordingly, the loss is charged to top management who, receiving the budget forecast, should have made various changes in their policy if the loss was to be converted into a profit. My point of view is that if the budget clearly indicates a problem to the top management, the latter should be held responsible for the forecasted loss.

The budgeter will at least do all he possibly can to avoid such extreme pitfalls. Management should be advised by him:

1. To expect much good from budgeting
2. Not to expect too quick results
3. To dominate the budget instead of being ultimately dominated by it.

#### B. ASSEMBLING THE DATA

Throughout this book, a special effort was made to indicate to the reader where he could find the data he may need for budgeting purposes. (See especially Chapter III, page 38 et seq., and page 53 et seq. See also Appendix B.) It is now time to emphasize an additional or rather an essential source of data that certainly the reader would not have overlooked in any case but the importance of which is not always fully recognized, namely, the business itself.

The business's own records provide a budgeter with a very great amount of data, the only problem being to put them in a form in which they are readily usable. The cost involved in analyzing past data is sometimes high. Great care should be taken to spend only the amount of money that is justified by the actual value of the data for the determination of future policy. In other words: the history of the business is of interest to the budgeter only inasmuch as it enables him to prepare a better forecast of future conditions.

Total sales data are generally available in a form where they are

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directly usable. If the company manufactures and sells many products, the break-down by product or groups of products, however, is not always helpful. For instance, the grouping of products in the past may have had little to do with the economic sensitivity of the product, which is of primary importance to the budgeter (see Chapter III).

A regrouping of total sales according to a more desirable pattern can, as a rule, be undertaken at an acceptable cost.

The same is not true for the sales mixture, since data will seldom be readily available. If there are only a few products sold, an analysis of past data may be easily made. If the lines of products are very numerous, the cost of reclassifying them will generally be prohibitive. It is, however, advisable to sample the sales of previous years from the point of view of the sales mixture, if only to convince oneself and management that an effective control of the sales mixture is in order.

Selling and administrative cost data are generally given in sufficient detail to enable the budgeter to get precise information as to their behavior.

Manufacturing costs, in modern business, are generally based on standards. A careful study of the variance accounts will give the budgeter a fair idea of the real value of such standards. If the variance in any account is substantial and unexplained, the standards are not reliable.

A study of the monthly cash balance of the last few years is easily accomplished and is an excellent source of information concerning the seasonal cash requirements of the business.

These are but a few examples of the use of company data, the careful study of which should precede any attempt to budget a business.

#### C. PREPARING THE COLLECTION OF FUTURE DATA. REEVALUATING THE ORGANIZATION

Such a study of past data will at the same time reveal how the system under which they were collected, classified, and analyzed could be adapted to the needs of budgetary control. It is probably the most urgent task of the budgeter to provide for the proper handling of data to serve his future purposes. Any delay in the matter will postpone the time of realization, for which an adequate classification of data is a prerequisite. As soon as he gets a clear picture of such a classification, the budgeter should take the necessary steps for a reorganization of the accounts and of the statistical analysis of data.

It is always desirable not to change the fundamentals of an accounting system during the fiscal year. However, to avoid losing time, the

budgeter will often request, before the end of the year, at least an informal accounting report of data classified according to the new set-up. In addition to providing him at an earlier date with figures classified as he wants them, it will also establish a basis for quantitative comparison between the two accounting systems, the new and the old one. This information will be useful later on, for the purpose of adjusting old data to compare them with new ones.

A good system of accounts should always reflect the organization itself. In other words, the accounting chart should correspond to the organization chart. When introducing budgeting, accounts have to be changed for the sake of providing data in a more usable form. To keep the chart of accounts in accord with the organization, the budgeter may thus have to recommend organizational changes.

For instance, the budgeter may recognize the need to classify sales by Federal reserve districts (for the reasons explained in Chapter III). This generally implies a revision of the sales districts themselves.

Furthermore, such a fundamental reexamination and reevaluation of the accounts provides the opportunity for reevaluating the organization itself, for redefining the responsibility of some executive or eliminating cross-lines of authority.

Therefore, it should be fully understood that the task of introducing budgetary control is far from being limited to the formal aspects of setting up forms and procedures. It also includes a fundamental reevaluation of the organization and a procedure should be provided for, under which recommendations in this matter are studied and presented for consideration. This point should be clearly understood and accepted by the organization as a whole. In fact, if the job is well done, it will be for the greatest benefit of everyone concerned.

#### D. DETERMINING THE ECONOMIC CHARACTERISTICS OF THE BUSINESS

The budgeter is thus preparing the frame (organization, accounting and statistical set-up) within which the business can be budgeted. Actual budgeting within this frame means, in final analysis: forecasting income (sales) and expense (administrative selling and manufacturing); forecasting the difference between sales and expense (profit-and-loss budget); forecasting receipt and disbursement (cash budget); forecasting capital income and expense (loans and capital-outlays budget).

The preparation of these numerous budgets implies the knowledge of three kinds of information:

1. A knowledge of the probable unit prices of equipment, materials, services, and goods to be purchased, rented, hired, or sold (selling prices, wage rates, commodity market, etc). Such a knowledge is comparatively easy to acquire within reasonable limits of accuracy. Detailed comments on the subject have been made in previous chapters.

2. A knowledge of the probable level of activity of the business during the period for which the forecast is made. The methods to be followed for forecasting were indicated in the chapters related to sales and production budget (Chapters II to VI) and to capital expenditures (Chapter XIII).

3. A knowledge of the economic characteristics of the business, i.e. a knowledge of the relationship between this level of activity of the business and the cost to maintain such a level; in short, a knowledge of the income-expense relationship within the business.

In a currently budgeted business, the budgeter knows such economic characteristics. When it comes to introducing budgetary control, the determination of the economic characteristics of the business is one of the first steps to be taken. In fact, the budgeter will attack this problem as soon as possible, while at the same time preparing the future frame within which to operate, as previously described.

The economic characteristics of the business are determined by:

1. The break-down of the total expense of the business in its fixed, regulated, and variable components. (For a definition, see page 125.)
2. The fixed expense.
3. The rate of variability of the items of variable expense (the slope of the trend of the break-even chart).
4. The variations of the regulated expense as related to substantial variations of the level of activity.

To determine these factors, the budgeter will analyze past data. Several methods can be followed. The authors suggest the use of any or all of the following three methods, which they have applied and found satisfactory. These three methods can be designated as:

- I. The empirical analysis
- II. The direct evaluation
- III. The sampling of costs.

These three methods will now be described.

## I. THE EMPIRICAL ANALYSIS

One of the early activities in setting up budgetary control is to ascertain the expense trends of the business as operated at present and currently reported by the accounting department. For this purpose the profit-and-loss statements and supplementary data of the past 12 months may be used. This is the empirical approach. These statements are usually based on account classifications which should be thoroughly examined to make sure that the classification of the items for labor, materials, and factory expense are rational. Should the cost-accounting system be based on standard costs it is necessary to learn how the standards are determined and to make due allowances for the monthly variance items. In the case of the analysis of costs per unit of output at varying rates of production for the several products the company manufactures, the methods of factory expense allocated by departments and by products must be carefully examined to make sure that these also are set up on a reasonable basis. After the above examinations are concluded, the monthly data on the costs of labor, materials, and factory expense may be plotted against the monthly sales or physical output and the trend lines of relationship established.

Figure 49 is an example, taken from our files, of the current-expense trends for a small assembly plant, one of several operated by a com-

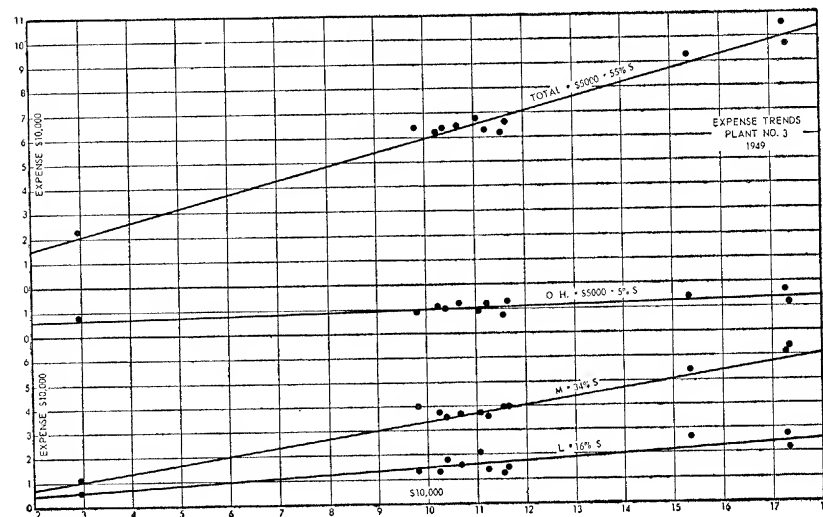


Figure 49. Empirical Determination of Expense Trends

pany, for which budgetary control is being designed. There are three general purposes which charts of this character serve and these are:

1. The management is made to realize that there are definite sales-expense trends even under non-budgetary controlled conditions, between the major items of expense and the degree of activity such as sales per month. This experience by management is very necessary, since it is a practical demonstration by the use of the company's own current data that there is an algebra, such as illustrated in Figure 49, that total expense follows the trend  $E = \$5,000 + 55\%$  of sales, upon which budgetary formulation of expense in relation to activity may be based.

2. By the scatter of the points along the trend lines, there is often demonstrated the need for better control.

3. The trend lines of performance before budgetary control serves as a base from which the savings in expense through budgetary control may be measured.

As many trend charts as the company's accounting data permit should be plotted in order that the preliminary empirical study may be as comprehensive as possible.

Incidentally, many companies find that the trend lines found for the operations of the preceding year, when reproduced in separate charts, serve the purpose of comparing current expenses with those of the prior year, by plotting the current data in such charts. Such charts may be used during the period of budget introduction as a means for training in their use.

Among the empirical trends of expense in relation to monthly sales which are usually possible to determine are:

1. The total expense before income taxes for:
    - a. The business as a whole
    - b. Divisions of the business such as subsidiaries, etc.
  2. The cost of sales for:
    - a. The business as a whole
    - b. Division of the business
    - c. The principal products manufactured and sold.
  3. The labor and materials costs and the factory burden for the same categories as under 2.
  4. The selling expense and administrative expense for
    - a. The business as a whole
    - b. The divisions of the business.
-

5. The cents of cost of sales and of administrative and selling expense per dollar of sales at varying monthly sales for:
  - a. The business as a whole
  - b. The divisions of the business
  - c. The principal products.

This latter analysis, especially Item b, is usually found to stimulate management to action on those divisions which are shown to exhibit high costs. The distribution of these charts to those executives who are in charge of the matters charted, together with conferences on their use for current control purposes during the period of developing budgetary control, are important steps toward developing the concepts of budgetary control throughout the organization.

## II. THE DIRECT EVALUATION

The method of analysis just described gives an accurate picture of what has actually happened in the past; it does not reveal how it did happen. Hence the choice of the name of *empirical method*. Specifically, it shows how the total expense and the various classes of expense did actually vary with production, but it does not indicate what part of the total expense is variable, what part is regulated, and how the regulated expense did itself vary. An exact knowledge of such relationships would obviously be of great help in projecting into the future any trend developed in the past.

At least a partial solution of the problem is offered by the method of direct evaluation of the expense account. In fact, both methods, direct evaluation and empirical analysis will often be used concurrently.

The direct evaluation is made by considering successively each expense account of the business and determining its character. Some expenses are obviously fixed. Such are, for instance: local taxes, depreciation (as a rule), rent, etc. Some expenses are obviously variable: direct material, direct labor (in manufacturing), for instance. Other expenses are known to be regulated, for example: supervisory expense. For the accounts to such well-defined expenses, there is no special difficulty. They are generally easily determined.

Other accounts are of a more doubtful nature. Some of them are obviously of a mixed nature. For instance, some time ago the authors, analyzing the expense of a given business, found that one single account was debited with:

1. Salesmen's salaries
  2. Salesmen's commissions.
-



The salesmen's salaries may be regulated by regulating the number of salesmen; the commission expense is a variable one.

In such a case, the proper solution is to split the account in two, which was actually done in this case. Salesmen's salaries and salesmen's commissions were from then on charged to two distinct accounts, the first being a regulated-expense account and the second a variable-expense account.

Very often the segregation would not be practical. For instance: the telephone and telegraph expense includes elements of fixed, regulated, and variable expense that could hardly be separated.

The authors have found it convenient in some cases, especially if the business is not too complex, to proceed by direct evaluation, considering each expense account individually and, in consultation with the various executives, determining its fixed, variable, and regulated components.

Table XXII gives the results of such an evaluation in a given manufacturing business. This evaluation was actually made prior to the intro-

TABLE XXII  
ANALYSIS OF ACCOUNTS IN TERMS OF FIXED,  
REGULATED AND VARIABLE COMPONENTS

<i>Name of Account</i>	PERCENTAGE		
	<i>Variable</i>	<i>Regulated</i>	<i>Fixed</i>
Raw material—Molded	100		
Raw material—Accessories	100		
Raw material—Packaging	100		
Outside labor	100		
Cartons & cases	100		
Freight-in	85	15	
Assembly labor direct	100		
Production control		100	
Plant supervision		100	
Indirect assembly labor	100		
Tool room wages	60	40	
Factory maintenance—Wages		100	
Building maintenance—Wages			100
Receiving department—Wages	20	80	
Shipping department—Wages	70	30	
Maintenance of molds			100
Small tools & jigs	60	40	
Equipment maintenance—Supplies	60		
Factory maintenance—Supplies	100		
Building maintenance—Supplies			100

TABLE XXII

<i>Name of Account</i>	<i>Variable</i>	PERCENTAGE	
		<i>Regulated</i>	<i>Fixed</i>
Receiving dept. expense	100		
Shipping dept. expense	100		
Freight out	100		
Rents			100
Light & power	50	25	25
Telephone & telegraph	50	25	25
Insurance	65	10	25
Employee welfare	100		
Salesmen salaries		100	
Sales clerical wages		100	
Sales traveling		100	
Commissions	100		
Advertising		100	
Sales promotion		100	
Entertainment of customers		100	
Sales dept. supplies		100	
Export dept.—Salaries		100	

<i>Name of Account</i>	<i>Variable</i>	PERCENTAGE	
		<i>Regulated</i>	<i>Fixed</i>
Export dept.—Expenses	80	20	
Officers salaries	100		
Offices expenses		100	
General traveling expense	100		
General office salaries		100	
Stationery & printing	80	20	
Office supplies & expenses	80	20	
I. B. M. rental			100
I. B. M. supplies & expenses	80	20	
Dues & subscriptions			100
Telephone & telegraph	80	20	
Other general expenses		100	
Professional services			100
Professional services—Others		100	
Research & engineering		100	
Charitable		100	
Sales discounts	100		
Interest & discount		100	
Payroll taxes	80	20	
Other taxes	100		
Depreciation			100

duction of budgetary control. The break-down of each expense account is indicated in percent of the total account for the year. On the basis of such an evaluation a break-even chart can easily be constructed.

### III. THE SAMPLING OF COSTS

The method of direct evaluation has one great advantage. It does not require a great amount of time. Yet, obviously it is only a first approximation. Furthermore, it does not indicate how the *regulated expense* varies. An answer to this question and a check on the results given by direct evaluation are offered by the method of cost sampling.

In this method, several expense accounts are selected, either because of their special importance to management or because of the impossibility of directly estimating their components with any reasonable degree of accuracy. These selected accounts are then followed month by month for a period of time and their behavior in relation to production variations is carefully studied.

As a result, their true nature can be determined. It is possible, even if they are regulated expense, to determine how they vary with production.

This method will be illustrated by an example. In a given business, numerous selected accounts were thus controlled during a period of 12 months. These accounts had been selected for various reasons. Some because of the substantial amount of expense involved; some because of their undetermined character; some because top management con-

TABLE XXIII  
MONTHLY VARIATIONS OF STOCKCHASING EXPENSE

	<i>Stockchasing Expense</i>	<i>Production (direct-labor standard dollars)</i>
January	450	8,406
February	595	7,478
March	793	8,555
April	487	7,151
May	154	1,974
June	842	9,691
July	1,148	12,056
August	1,842	16,257
September	1,154	12,822
October	641	5,506
November	639	6,996
December	675	7,437

sidered them as a test of good local management (it was in a highly decentralized organization). One of the accounts was the stockchasing expense, an item of indirect labor.

During the twelve months period considered, the stockchasing expense in a given department varied as indicated in Table XXIII. The table also indicates the variations of production (as measured by the direct-labor expense at standard) in the same department. By plotting the stockchasing expense in ordinate and the variations of production in abscissa, as was done in Figure 50, the characteristics of the expense

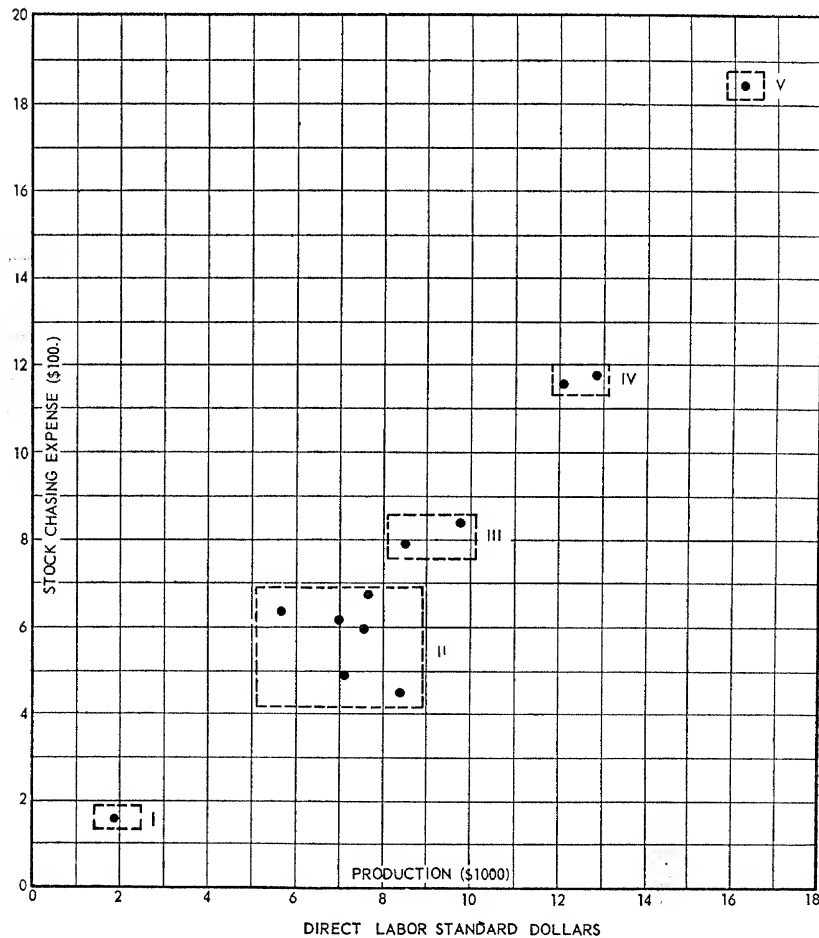


Figure 50. Stockchasing Expense Variation in Relation to the Rate of Production

appear clearly. It is a regulated one and its variation in relation to production is illustrated by Figure 50. There are five levels of expense, which can be approximately defined as follows:

1. For production at rate 2,000 (\$2,000 of direct labor during the month)
2. For production between 5,000 and 8,500
3. For production between 8,500 and 10,000
4. For production between 12,000 and 13,000
5. For production at about 16,000.

It is on the basis of such an analysis that the budgeter will be in a position at some future date to forecast the probable amount of a given regulated expense in relation to a given forecasted amount of production.

The reader will notice that in the example given the variations in the rate of production, as measured by the standard direct-labor expense were very substantial from one month to another (1,974 in May, 9,691 in June, 12,056 in August, etc.). Such important variations are expensive and should indeed be avoided. Stabilization of production is precisely the essential goal of budgetary control. At the time the above analysis was made, budgetary control had not yet been introduced.

#### CONCLUSION

Every business is a special case and the introduction of budgetary control in any given business raises specific problems for which no solutions can be given in advance. As general guiding principles, it can be said that the budgeter should take two essential steps:

1. Carefully analyze past data available and determine the economic characteristics of the business.
2. Prepare the adjustments needed to the frame in which he will operate: adjustments to the accounting set-up, the assembling of statistical data, and, above all, to the organization itself.

Many obstacles have to be overcome, psychological as well as technical ones. Yet the results to be obtained are worth the effort.

It is a fact that the general trend is toward more budgetary control in industry. It is an even more significant fact that, to the best knowledge of the authors, there is no case of any business having given up its budgetary control once it had been adopted by the organization.

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In fact, budgetary control, when properly practised, is probably the last word in the technique of scientific management and also the best method yet devised for developing the team spirit in any given organization.

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## APPENDIX A

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## APPENDIX B

### SELECTED LIST OF BUSINESS AND STATISTICAL SOURCES OF DATA FOR SECTIONS OF THE UNITED STATES

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2. Federal Reserve Bank of Boston. *Monthly Review*.
3. Federal Reserve Bank of Chicago. *Business Conditions*. Monthly.
4. Federal Reserve Bank of Cleveland. *Monthly Business Review*.  
General description of conditions in the 4th district, and business statistics for 12 of its largest cities.
5. Federal Reserve Bank of Dallas. *Monthly Business Review*.  
General statistics and description of conditions in the 4th district; some statistics for its larger cities.
6. Federal Reserve Bank of Kansas City. *Monthly Review; Agricultural and Business Conditions*.  
General statistics, with a few by cities, for the 10th district.
7. Federal Reserve Bank of Minneapolis. *Monthly Review of Ninth District Agricultural and Business Conditions*.  
General statistics, mostly broken down for the district's states rather than for its cities.
8. Federal Reserve Bank of New York. *Monthly Review of Credit and Business Conditions*.
9. Federal Reserve Bank of Philadelphia. *The Business Review*. Monthly.  
General articles plus monthly statistical section for the 3rd district; local conditions for 13 cities.
10. Federal Reserve Bank of Richmond. *Monthly Review*.  
General survey of conditions in the 5th district, with a statistical section containing numerous breakdowns by cities.
11. Federal Reserve Bank of St. Louis. *Monthly Review*.  
General survey, with some treatment by cities, for the 8th district.
12. Federal Reserve Bank of San Francisco. *Monthly Review*.

## II. REGIONAL.

*Congress of the United States*

1. *Handbook of Regional Statistics*. Washington, D.C.: Joint Committee on the Economic Report, 1950.

*Miami Valley*

1. *Miami Business Review*. School of Business Administration. Miami: Miami University. Monthly.  
Usually has a general article, plus tables covering the "Business situation at a glance."

*New England*

1. *New England Letter*. Boston: First National Bank. Monthly.  
Statistics are included as part of the general economic survey.
2. *New England Trends*. Boston: First National Bank. Quarterly.  
General business charts.

*Pacific Northwest*

1. *Pacific Northwest Industry*. College of Business Administration. Bureau of Business Research. University of Washington. Monthly.  
Business activity indexes and charts for the Pacific Northwest, Puget Sound, Inland empire, lower Columbia Basin. Annual forecasts. General articles on region's business and economic conditions and prospects.
2. *Quarterly Summary of Pacific Northwest Industries*. Seattle: First National Bank. Quarterly.  
"Northwest business indicators; cumulative comparisons." General descriptions plus statistics of business conditions.

*Southern States*

1. *Manufacturers Record*; devoted to the Industrial Development of the South and Southwest. Monthly.  
Has a page, "Southern business outlook," giving statistics of production, finance, trade, etc., for 16 states.

## III. STATE.

1. Alabama, University of. School of Commerce and Business Administration. Bureau of Business Research. *University of Alabama Business News*. Monthly.  
Business indicators by cities, counties, and types of business.
  2. Florida, University of. Bureau of Economics and Business Research. *Economic Leaflets*. Monthly.  
General articles, usually only one to an issue; sometimes these include statistics on Florida conditions.
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3. Georgia, University of. College of Business Administration. Bureau of Business Research. *Georgia Business*. Monthly.  
General surveys plus a page of statistics of retail sales by type of store for the state and its main cities.
  4. Illinois, University of. College of Commerce. Bureau of Economic and Business Research. *Illinois Business Review*; a Monthly Summary of Business Conditions for Illinois.  
Many detailed statistics and charts; also "Comparative economic data for selected Illinois cities."
  5. Indiana, University of. School of Business. Bureau of Business Research. *Indiana Business Review*; a Monthly Summary of Trade and Industry in Indiana.  
Statistics by types of business and localities. Charts for state business activity as a whole.
  6. Iowa State University. College of Commerce. Bureau of Business and Economic Research. *Iowa Business Digest*. Monthly.  
General articles and special. "Iowa trends," charts and statistics on sales, bank debits, department store sales, etc. No special city figures.
  7. Louisiana State University. College of Commerce. Division of Research. *Louisiana Business Review*; a Monthly Summary of Business Conditions in Louisiana.  
Charts and statistical tables covering conditions in the whole state. Summaries and statistics on conditions in various businesses. Local business indicators for 17 cities.
  8. Maryland, University of. College of Business and Public Administration. Bureau of Business and Economic Research. *Studies in Business and Economics*. Quarterly.  
Monographs, usually including statistics on the subject covered.
  9. Mississippi State College. School of Business and Industry. Business Research Station. *Mississippi Business Review*; a Monthly Summary of Business and Industry in Mississippi.  
Statistics and charts of business activity for the state and by districts.
  10. Mississippi, University of. School of Commerce and Business Administration. Bureau of Business. *Business Bulletin*. Bimonthly.  
A general article in each issue, plus "Weathervanes for Mississippi business."
  11. Nebraska, University of. College of Business Administration. Department of Business Research. *Business in Nebraska*.  
Each issue has statistical features, but there are no continuous series.
  12. New Jersey. *Review of New Jersey Business*. Prepared cooperatively by the New Jersey State Department of Conservation and Economic Development, and the Bureau of Economic Research, Rutgers University. Quarterly.
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- General articles and regular statistical features, including "Business trends in local areas."
13. New Mexico, University of. College of Business Administration. Bureau of Business Research. *New Mexico Business*; a Monthly Review of Business Conditions in New Mexico.
  14. New York. N. Y. State Department of Commerce. *Commerce Review*. Monthly. A digest of business developments. *Business statistics*, (selections).  
General survey of state business, plus detailed figures for 9 districts covering the state.
  15. Ohio, State University. College of Commerce and Administration. Bureau of Business Research. *Bulletin of Business Research*. Monthly. Ohio and U. S. charts and summaries. Also business conditions in 8 of the state's main cities.
  16. Oklahoma, University of. Bureau of Business Research. *Oklahoma Business Bulletin*. Monthly.  
Summary of conditions in the state as a whole, by businesses, and brief paragraphs for 23 cities.
  17. Oregon, University of. Bureau of Business Research. *Oregon Business Review*. Monthly.  
"Current business trends in Oregon."
  18. Tennessee, University of. *Tennessee Business*. Bimonthly.  
A special edition of the University's Newsletter, issued every other month. General business news, plus a few general statistics.
  19. Texas, University of. College of Business Administration. Bureau of Business Research. *Texas Business Review*; a Monthly Summary of Business and Economic Conditions in Texas.  
Charts and statistical tables covering conditions in the whole state. Summaries and statistics on conditions in various businesses. Local business indicators for 33 cities.
  20. Utah, University of. College of Business. Bureau of Economic and Business Research. *Utah Economic and Business Review*; Quarterly Review of Business.  
Comparative figures for the state in the present quarter with conditions in the preceding quarter and preceding year. Detailed figures under headings "Production," "Agriculture," "Trade," "Finance," "Construction" and "Finance."
  21. Vermont. Department of Industrial Relations. *Official Directory of Vermont Industries*.
  22. *Virginia Farm Economics*. (Published by the Virginia Department of Agricultural Economics and Rural Sociology, Agricultural Extension Service, in cooperation with the U. S. Department of Agriculture.  
General articles on farm problems, and detailed figures on prices paid to producers for farm products.
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## IV. CITIES.

1. *Buffalo Business* (Buffalo Chamber of Commerce). Monthly.  
Statistics and charts of Buffalo business indicators.
  2. *Detroitier* (Detroit Board of Commerce). Weekly.  
Some business statistics for Detroit, but not in all issues.
  3. (New York) Commerce and Industry Association of New York. *Bulletin*.  
General business and economic conditions in New York City; only a few statistics.
  4. Pittsburgh, University of. Bureau of Business Research. *Pittsburgh Business Review*; a Monthly Summary of Business and Economic Conditions in the Pittsburgh District.  
Detailed figures on business conditions, production, employment, trade, shipments, etc.
  5. Toledo, University of. Bureau of Business Research. *Toledo Business Review*. Monthly.  
Statistics on all sides of the economic picture, with comparative figures for the previous month and year.
  6. (Wilmington) Chamber of Commerce of Delaware. *News Bulletin*. Monthly.  
Wilmington business indices.
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## APPENDIX C

### BAUSCH AND LOMB OPTICAL COMPANY

The Bausch and Lomb Optical Company, established in 1853, manufactures and sells optical and scientific instruments, spectacle lenses and frames, and other ophthalmic products.

There are at least three good reasons to choose this company as an illustration of practical application of budgetary control principles.

1. This company pioneered the field under the leadership of its controller (and director) Mr. Edmond S. La Rose, one of the most prominent experts in industrial budgetary control.

2. The company's budgetary control is a well-integrated one, and has proved extremely successful over the years.

3. The company is of substantial size, employing around 9,000 workers in its Rochester plants and affiliated manufacturing and distributing companies. The problems it faces are numerous and complex, which tends to indicate that if budgetary control can work well in such a company it should be practical and advisable in almost any kind of business.

To give an idea of the extreme complexity of the problem faced when budgeting the Bausch and Lomb Company, it will probably be sufficient to indicate that:

- a. The annual sales which reached \$60,000,000 in 1944 were down to \$38,400,000 in 1948.

- b. The company manufactured and sold in 1949 well over 200,000 different items involving over 1,500,000 parts.

- c. The wholesale selling price of each item ranges from 30 cents a unit for a certain lens up to about \$50,000 a unit for some expensive optical instruments.

A full and detailed study of the budgeting procedure followed at Bausch and Lomb would require more than the space available in this book. Reference is made to books and articles already published on the subject.<sup>1</sup>

In the following pages, an attempt will be made to give the reader a general understanding of the principles applied. The courtesy of Mr. La Rose, who permitted one of the authors to investigate the procedures followed, is hereby very gratefully acknowledged.

<sup>1</sup> See, among others: La Rose 1931, 1940, 1944, 1947, 1950; Macdonald, 1946; Villalon, 1949.

As a general characterization of the procedures followed at Bausch and Lomb in the matter of budgetary control, it may be said that two fundamental principles are inspiring them. These two principles, the value of which the reader will not fail to recognize, are:

- I. Integration through forecasting
- II. Control for stabilization.

How these two fundamental principles are being applied will now be shown.

#### I. INTEGRATION THROUGH FORECASTING

By integration is meant that budgeting is considered as a *whole*, embracing all the various activities of the business. Such an integration is based, not on mere assumptions but on actual and precise forecasting.

##### A. *Integration*

It was stated at the beginning of this study that budgetary control is not the sum of independent parts, any of which can at will be disregarded but that it is a whole system of control that cannot be split, nor any part omitted, without losing most of its reason for existing.

At Bausch and Lomb, this principle is being applied to its full extent. Every single activity of the business is budgeted: sales, inventory building or inventory reduction, production, expense, cash handling and capital expenditure as well as profit and loss. Not only is each of such activities budgeted in great detail (sales by product and by district, inventory by product classes, etc.) but they are, all of them, budgeted as part of the whole: production is budgeted in relation to sales and inventory, capital expenditures in relation to cash, profits and market expansion, etc.

The complete budget is due in its final shape one month before the start of the year. (Estimates for production requiring more than a two-month "lead" in materials or components are indeed made earlier.) At this point, the budget appears as:

1. *An accounting document* which represents the probable balance sheet and profit-and-loss statement as of the end of the following year, with detailed appendix and supporting statements.
2. *A planned schedule of activity* that will regulate the life of the organization for the following twelve-month period (or even five-year periods as far as capital expenditures are concerned), subject to possible but in fact limited revisions and changes.
3. *A yardstick* with which management will be able to measure and therefore control its actual performance versus the budget.

##### B. *Integration Through Forecasting*

Complete integration of the business life in a budget is sometimes attempted without a definite forecast as to times and amounts, but only on

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the basis of a wide range of probabilities. This is the method followed in a certain type of "flexible budgeting."

In such types of budgeting, the expense is budgeted in relation to assumptions made concerning various levels of production within a given range of variations, which are all considered as possible. No attempt is made to forecast which of these levels will be the actual one at any time.

This failure to forecast as to times and amounts in flexible budgeting has been severely criticized by the Bausch and Lomb's controller who calls it "a crutch for weak executives who have not absorbed the art of forecasting." Forecasting, he insists, is the real basis for integration.

The forecasting methods followed at Bausch and Lomb are based on specialization of responsibility and classification of products.<sup>1</sup>

The sales manager is responsible for determining the specific sales levels; the controller, who is also the budgeter, is responsible for defining the probable influence of the general economic forces and also that of administrative decisions taken by the board of directors of which he is a member.

The products and parts are so numerous that it would just be impossible to forecast sales item by item. A product classification of all the items actually manufactured has been established. According to this classification, reproduced in Figure 51, there are 22 classes of products.

The inclusion of a product within a given classification is based on its economic sensitivity. (See Chapter III.) One or more economic indexes are used for determining a reference trend for each class of product. The best-adapted index or indexes have been determined on the basis of years of experience and sometimes after some disappointments.

The indexes used are, generally, the same as the ones recommended in Chapter III. Extensive use is made of a composite "volume index" for consumer product which is obtained by dividing the department store index (published in dollars for each Federal reserve district) by the retail price index (published by the Department of Commerce). The essential advantage of computing such a composite index is to provide the business with a "volume index" (i.e. valid for physical units of sales) for each Federal reserve district, which would not be otherwise available.

The trend of growth of each class of product<sup>2</sup> is, as a rule, empirically determined by considering as due to growth any long-range trend variation (positive or negative) that is not functionally related to the economic trend chosen as the reference trend.

The sales forecast is established, for each class of product, district by district. The sales district limits have been purposely determined to take full advantage of a regularly published local economic index. In fact, many sales

<sup>1</sup> Such principles have been explained with some details in the text. See above, Chapter III and V and especially page 55 and ff.; page 75 and ff.

<sup>2</sup> For a definition of the trend of growth, see above, Chapter II, page 33 et seq.

BAUSCH & LOMB OPTICAL COMPANY	
PRODUCT CLASSIFICATION	
Effective: 7-1-1948	
01 (A-1) GOLD FILLED	Frames and Mountings, incl. Gold and Nicaloy.
02 (A-2) CASES	Spectacle and Eyeglass Cases.
03 (A-3) ZYLONITE	All Zylonite Frames.
05 (A-5) INDUSTRIAL GOGGLES	All types of Industrial Goggles, Face Shields, Accessories, etc.
06 (A-6) SUN GLASSES	All types of Sun Glasses, (incl. Ray-Ban, Army & Navy) Polaroid, Parts, etc.
11 (B-1) SINGLE VISION LENSES	Plano, Doublet, Peris, Meniscus, Flat or Toric Cylinders, Prisms, Wafers, (Contex or Celex) Orthogon, Orthosin, Orthorex, Balcor, Balux, Balux, Spheres, and Cylinders. Optical Blanks, Pressings and Prescriptions for above.
12 (B-2) BIFOCAL AND TRIFOCAL LENSES	Orthogon Utex, Balcor Utex, Bites, Balux. Orthogon Bifocal (D-C-F), Nekrome, Ful-Vue, Kryptok, Baltex Pressings and Prescriptions for above.
13 (B-3) INDUSTRIAL AND SUN GLASS LENSES	Industrial and Sun Glass Lenses, Hardened and Unhardened. Welding Glass Circles and Plates. Pressings and Prescriptions for above.
14 (B-4) PANOPTIK LENSES	All Panoptik Bifocal, Trifocal, Lenticular Cataract, Pressings, Squares and Prescriptions for same
21 (C) OPTICAL MACHINERY	All Optical Machinery, Tools, Accessories and Supplies including Grinding, Polishing and Cementing Materials.
31 (D-1) MICRO. AND ACCESS.	Microscopes. Laboratory, Research, Polarizing, Wide Field, Comparison, Brinell, Shop and Dissecting, Objectives, Eyepieces, Nosepieces, Analyzers and Polarizers, Camera Lucidas, Mechanical Stages, Micro. Manipulators, Micro. Drawing App., Condensers, Vert. Illuminators, Micro Lamps, Transformers and Resistances, Slides, Cover Glasses, Haemaeytometers, Dust Counter Microtomes and Accessories, Centrifuges, and Accessories, R. A. Prisms 2" and under Phase Contrast Accessories.
33 (D-2) OPT. MEAS. INSTRS.	Colorimeters, Densitometers, Interferometers, Spectrometers, Spectrographs, Monochromators and Accessories, Photometers, Opacimeters, Glosimeters, Color Comparators, Saccharimeters, and Refractometers, Polarimeters, Optical Meas. Instrs. and Access., Contour Proj. and Access., Lamp Filament Proj., Toolmakers Micro. and Access., Industrial Tools.
41 (E-1) PROJ. APPAR.	Balopticons and Accessories, Film and Slide Projectors, Television Projection Lenses—Mtd., Bulb Mirrors and Reflectors; Projection Lamps, Lenses and Condensers; Cinephor Lenses and Condensers; Sound Reproducers and Records; Photophone Units.
42 (E-2) PHOTO MICROGRAPHIC	Photo Micro Cameras, Lamps and Accessories; Metallosopes and Accessories, Proj. Micro. and Accessories, Micro Tassar Lenses, X-Ray Stereoscope, Ortho Stereoscope Head, Euscope and Accessories, Micro. Movie Attachment.
43 (E-3) MIRRORS, OPTICAL GLASS & SPECIAL LENSES	Parabolic and Spherical Glass Mirrors, Stellite Mirrors, Mangin Mirrors except 5" 8" used in Balopticon, Dome Doors, Diverging Strips, Dental Mirrors, Graflex Mirrors, Television Mirrors All other Mirrors not specifically covered in other classes. Optical Glass and Pressings, Special Customer Lenses, incl. Toledo Scale
51 (F-1) PHOTOGRAPHIC	Aero Tassar, Anastigmat, Telegmat, Telephoto, Metrogon, Animar, Baltar, incl. Television Finder and Taking Lenses, Tessars, IC, and IIB, Wide Angle Ser. IV, Ser. V, Protar Ser. VII, Ser. VIIA and Process Lenses, Photo Engraving Prisms incl. R. A. Prisms over 2", Photo Enlarging Condensers—Mtd. and Unmtd., Photographic Filters Vertical View Finders, Lens Barrels, Shutters, Lens Caps, Flanges and Misc. Access.
53 (F-3) PHOTOGRAMMETRIC INSTRUMENTS	Multiplex Projectors, Frames, Tracing Tables, and Accessories, Reduction Printers, Rectifiers, and Miscellaneous
61 (G) TELESCOPES, FIELD CL., & ENGINEERING INSTRS.	Telescopes and Access., Spotting Scopes, Ship Telescopes and Gun Sight Optics, Field Glasses, Monoculars, Binoculars and Sport Glasses; Engineering and Navigation Instrs. and Access., Incl. Sextants, Octants, and Drift Meters
71 (H) OPHTHALMIC INSTRS.	Ophthalmological Equipment and Access., Head Mirrors, Operating Lamps
81 (I) SPECIALTIES	Magnifiers, Plastic and Metal, Doublets, Coddingtons, Aplanatic, Hastings, Q R and Fingerprint, Battery and Henry Code Disc, Focusing Glass, Pic Counter Watchmaker Glasses, Linen Testers, Readers, Magnarules, Film Viewer Amateur Microscopes and Equipment
91 (J) MILITARY INSTRS.	Fire Control Apparatus, Range Finders, Trainers, Height Finders, Periscopes, Gun, Bore, Rifle and Turret Sights, Military Telescopes, and Special Navy Ray Filters.
95 (K) OUTSIDE PRODUCT	Labor operations performed, and Metal Castings made for outside customers.
Approved by Engineering Division	
Form 5331-6	

Figure 51. The Twenty-Two Fundamental Classes of Products Manufactured by Bausch and Lomb Optical Co.

districts are identical to Federal reserve districts so as to make it possible to use the Federal district department store sales index.

After the sales forecast has been prepared in terms of dollars of sales for each class of product and for each area, by joint effort of the budgeter's office and of the sales department, each according to its own field of responsibility, the sales department prepares the sales budget by major items (or groups of items). This sales forecast is prepared in dollars of sales at selling price and also at cost of sales (at standard cost of sales).

The budgeted cost of sales, by major items (or group by group), is then regrouped by categories within each of the fundamental 22 classes of products described in Figure 51.

The purpose of this regrouping of the budgeted cost of sales category by category is to prepare the future control of the sales mixture by applying the method described in Chapter IX, page 170 et seq.

By using the turnover ratio of each item (or group of items) and comparing the cost-of-sales forecast to the inventory on hand, the inventory increase or reduction is easily budgeted (see above, page 113). The productivity requirements are thus easily determined.

The purchasing department receives a schedule of the material requirements for the year.

The expense budget is established department by department on the basis of the production requirements. The actual manufacturing program is subsequently scheduled, according to needs, within the frame of this expense budget.

## II. CONTROL FOR STABILIZATION

Before the year has even started, a well-integrated program is thus prepared, which will regulate the life of the organization during the following period of twelve months.

Such a program is based on an actual and definite forecast of sales.

The experience at Bausch and Lomb, confirmed by many other important and well-known business organizations, shows that the sales forecast, if carefully prepared, may reach a high degree of accuracy.

It is nevertheless a fact that the forecast cannot and will not, always, and for all products, be completely accurate. The program of integration must therefore be controlled and adjusted, from time to time, to actual circumstances.

If the adjustments are made haphazardly, under the pressure of day-by-day hopes, disappointments and hunches, the control may be a costly one that will more or less nullify the beneficial effects of the whole budgeting procedure.

If, on the contrary, the control is exercised for the purpose of stabilizing the business, it safeguards all the advantages of integration through budgeting while at the same time introducing the necessary element of flexibility.

Such a policy is followed at Bausch and Lomb where the control's primary purpose is stabilization.

#### A. Control

The control system has been designed to serve the special needs of the company. As similar needs are likely to be found in many other cases, this system will be described with some details.

There are three main types of control:

1. A general control by class of products
2. A selective control of the main items
3. A predictive control for certain types of products.

1. *General control by class of products.* This control is based on the construction of a set of five control charts for each class of products.

For the purpose of facilitating the presentation of data this set of five charts is prepared, each month, on one sheet that is used throughout the year.

Such a sheet is reproduced in Figure 52. As there are 22 classes of product and one set of five charts for each class, the whole general control of the budget is followed throughout the year by using only 22 sheets similar to the one reproduced in Figure 52.

The months of the year are in abscissa, the horizontal scale being the same for each of the five control charts.

Starting from the top the five charts are used as follows (the curves in Figure 52 are for illustration purpose only):

- a. "Sales over-or-under budget" accumulated.
- b. Relative monthly comparison of actual and budgeted "sales."

These two charts are self-explanatory. The first is cumulative throughout the year, while the second indicates monthly results. The monthly average (budgeted) is given as reference.

- c. Relative comparison of actual and budgeted accumulated inventory increase or decrease.

This chart controls the actual inventory as compared to the budgeted inventory. It is the fundamental chart for the control of the equilibrium between sales and production. For a full explanation of the control of this equilibrium through the use of a budgeted inventory, see Chapter VI, page 105 and ff.

- d and e. Material and labor.

These two charts are self-explanatory. They control the actual material and labor expenditures in relation to the budgeted material and labor expenditures. The monthly average (budgeted) is given as reference.

The attentive reader has certainly noticed that none of these charts controls the "sales mixtures." In fact, the third graph (inventory increase or decrease) is used not only for inventory control but also for the sales-mixture

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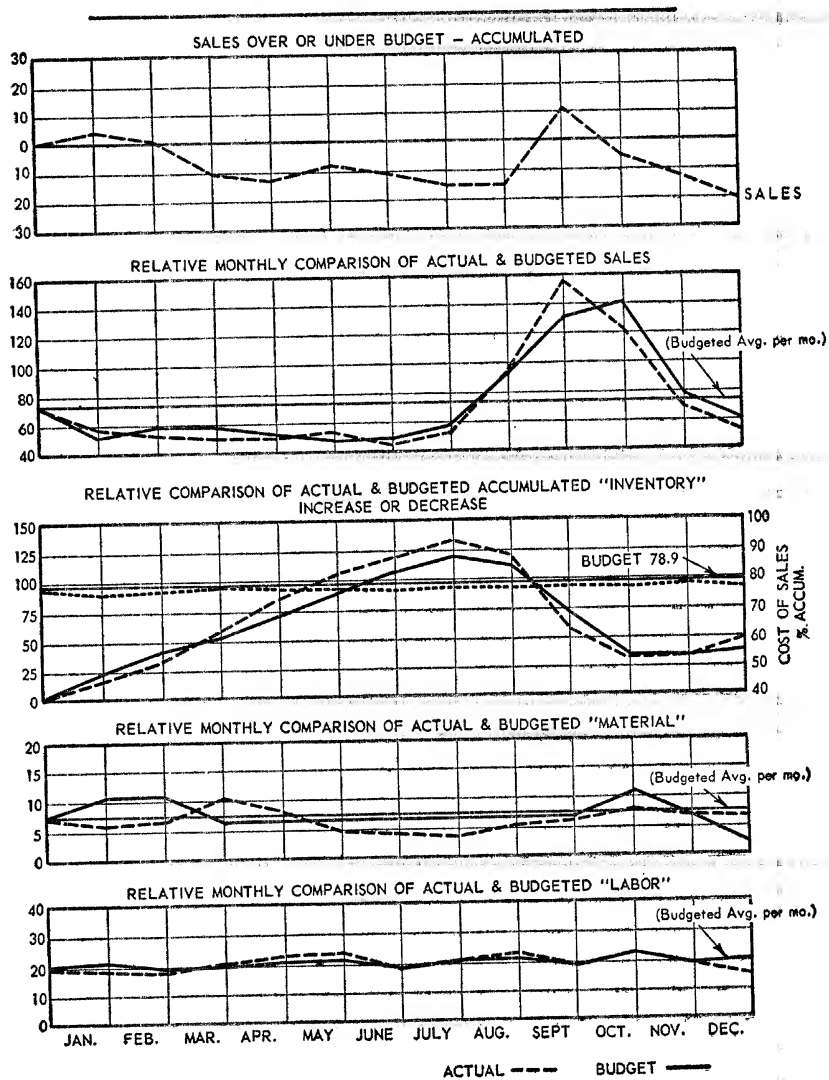
SALES, COST, PRODUCTION & INVENTORY  
ACTUAL vs. BUDGET

Figure 52. General Control Chart of Budget at Bausch and Lomb Optical Co.

control by plotting, in addition to the inventory curve, two additional curves: budgeted cost of sales and actual cost of sales (at standard cost). These additional curves have been plotted in Figure 52.

The reader is referred to Chapter IX, page 170 for a detailed explanation of the methods to be followed for the control of the sales mixture through the use of a budgeted cost of sales.

2. *Selective control of the main items.* The general control just described under (1) is applicable to all items manufactured. It does not provide any indication as to the sales of each item individually considered nor does it lend itself to a frequent control (week by week or even day by day if management should consider it advisable).

A careful sales analysis having revealed that 85% of the sales volume is from less than 15% of the items sold, it was decided to establish a selective control of these, the "main items." This selective control is flexible and adapted to the needs of the moment. It may be more or less detailed, depending on the circumstances and the items considered.

3. *Predictive control for certain types of products.* Experience has shown that some items are normally ordered by the customers a few months in advance. Such, for instance, are most items of Class D-1 (microscopes and accessories), sold, as a rule, to laboratories.

For such and similar items, the orders received precede the "sale" by a few months ("sale" is here taken in its accounting sense, which means "shipment"). Thus, if the average time lag is determined for each of such items, it is possible to forecast the chance of making the sales budget by following the trend of orders received.

This provides a sort of "predictive" control, which is in fact extensively used by the company in all cases where it is practical.

#### B. *The Purpose: Stabilization*

Each and all of the above methods of control have the same purpose, which is the stabilization of the business at any level of activity.

If the sales budget is being met, stabilization results from the fact that the production budget has been stabilized throughout the year, in accordance with methods fully explained in the text (see page 115 and ff.).

If, on the contrary, the controls reveal, during the year, that the sales budget is not being met (or is not sufficient) for any product or group of products, appropriate action is taken. Yet the purpose of the whole budgetary control, the stabilization of the business, is kept in sight.

The conflict between the necessity of adjusting production to sales and the purpose of stabilization is solved by using the reservoir effect of the inventory.

If sales are more than expected, the actual inventory will decrease below the budgeted level; the opposite will be true if actual sales are less than the budgeted ones.

As a matter of policy, actual production is not adjusted unless actual sales

are departing from the budgeted ones for a substantial period of time (three months as a rule). Then, if and as it becomes clear that the discrepancy between actual and budgeted sales is not due to accidental and more or less temporary factors but to a real change in the sales pattern, the production schedule is changed.

At this point, the production is decreased (or increased) not only to take into account the difference between actual and budgeted sales but also to account for the need for inventory adjustments. The inventory, having been used as a cushion during a substantial period of time, must be brought back to its desirable level. This is done by decreasing (or increasing) production by a bigger quantity than the actual difference between actual and budgeted sales. Production is stabilized at a new level.

The changes in production are ordered by the budgeter's office and expressed in terms of variations of direct labor from the direct-labor budget. The production executives regulate accordingly the size of their working force. In addition, they will also adjust their other production expenses on their own initiative and under their own responsibility.

Such adjustments of the other production expenses are greatly facilitated by the accounting policy of the company which has converted as many items of expense as possible into *variable* expense. For instance: the depreciation expense is a variable one for about 80% of its total.

#### CONCLUSION

The results obtained by such a well-integrated budgetary control have been impressive.

Over the years, the budget has generally been met within a few percent. As a result of the predetermined planning resulting from budgetary control, the yearly labor fluctuation, above and below the average monthly number of employees has changed from 33.5% above average and 10% below average in 1924 (before budgetary control was introduced) to less than  $\pm 4\%$  for the succeeding years.

In 1948 the direct-labor budget was met within 1.5% and the overhead-expense budget was met within less than 2% variation. During the same year, the actual earnings per share of common stock were within 2% of the budgeted earning.

Such figures clearly show to what extent guesswork may be actually taken out of management by developing a well-adapted and well-integrated procedure of budgetary control. However, although the budget is a new and sharp tool for management control, it will not improve or produce profits unless management is fully aware of its requirement in regard to possible change in selling prices, market absorption, manufacturing costs, required technological improvements, trained personnel, and other factors in the plan of operation.

## APPENDIX D

### BASIS FOR MEASURING OUTPUT

It has been shown that budgeting the expenses of a manufacturing business is based on forecasting the probability of sales, of manufacturing expenses, of the expense of distributing the product, and of managing the business *under specified conditions of operation*. These specified conditions include, among other considerations, the prices and rates for labor, materials, and services. Following any changes in these particulars there will need to be changes in the budgeted amounts. The budget is also based on certain conditions of operation, such as the efficient use of materials, labor, and machinery. Changes in any of these conditions will also result in changes in expenses. The control of expenses consists of observing the actual expenses incurred, comparing them with the budgeted amounts, determining the reason for changes or variance, if any, revising forecasts affected by changed conditions not subject to control such as the changed market prices for materials, labor and services; and adjusting operation conditions so as to bring the controllable expenses into line. There are two general relationships which budgeting is intended to bring under control and these are:

1. Expenses in relation to receipts or revenue
2. Costs per unit of output.

Among the techniques which are useful for control purposes are tabular statements, charts, and formulas. Each of these techniques is based in part on data derived from the measurement of expense in relation to output. One of the problems of the budgeting and expense control is the measurement of output and this in turn raises the question of the units in terms of which output may be expressed.

The first problem in setting up a plan for control is to determine what is the output and how it may be measured.

#### I. GENERAL CONSIDERATIONS

If a shoe manufacturer, for example, should state that last year he produced one million pairs of shoes, or a merchant should state that he sold one million parcels of goods or a machine-tool manufacturer should state that he produced one thousand machines, each of these numbers is arithmetically meaningless because there are no standard units such as a pair of shoes, a

parcel, or a machine, to which these numbers refer. If the shoe manufacturer, however, produced only one type, size, and quality of shoe or the machine-tool manufacturer produced one thousand machines all alike in every respect, then the output of their factories could be measured in units of specific products, that is, in physical units.

But there are very few companies which manufacture a single product, such as sugar, for which the annual production can be measured in pounds or standard-sized containers such as sacks or barrels. For a company manufacturing a variety of products there would have to be as many physical units as there are distinct commercial products. This would frequently, even with small-sized companies, be a long list. There is no *one single physical unit* by which the total output could be expressed as it can be in the case of sugar mills, cement mills, and some chemical plants, in which all units of output are physically identical.

Fortunately physical similarity is not the important matter in budgeting. What is to be observed is *economic similarity*. If ten physically different units of product can each be produced at a labor cost of one dollar, the budgeter can easily schedule the labor for any quantity of indiscriminate lots of these products for they are all alike in respect to labor cost. One thousand of such products mixed in any proportions physically can be added economically *in terms of labor cost*. The use of a commercial physical unit for measuring output of economically dissimilar products should be avoided in the budgetary control of costs.

A lumber mill, while it may have its output measured in board feet, or a foundry whose output is measured in tons, cannot always use these measures for budgeting the costs of production of the total output. In the case of a lumber mill the labor cost per board foot of an 8" x 8" timber is less than the labor cost per board foot of 1" x 6" roofers with tongue and groove. In the case of a foundry, the labor cost per ton to produce hand-molded and cored castings is different than that required to turn out machine-molded parts in quantity production. The board foot or the ton in relation to the cost of production in each of these cases varies for each unit of commercial product. In the case of a division of manufacture such as the internal grinding of cylinders in an automobile-engine factory, there is no single physical unit of output by which costs in relation to the productivity of the department may be measured, except of course it should so happen that only one type and size of cylinder block were being processed. When there are several sizes of cylinder blocks being processed in the grinding department a compound physical unit for measuring output may be devised as follows:

## II. COMPOUND PHYSICAL UNIT

Since total variable costs are directly related to the rate of production, that is, the quantity produced in a given time, it appears that if there are three sizes of cylinder blocks (A, B, and C) and the *standard* time for grind-

ing each is established, then the quantity of B and C blocks can be reduced to *equivalent* A blocks according to their respective grinding-time ratios. The physical unit of output would then be measured in "equivalent A blocks." In the case of the grinding department it should be noted that all the circumstances of production such as machines, labor skills, wage rates, supplies consumed, etc., are similar for all the different-sized blocks being processed, so that the expense relationships to output are similar for each size of block. It is only under such circumstances that an equivalent physical unit may be used as a measure of production in relation to expense. Such a physical unit is not applicable to the measurement of the production of a foundry in which only some of the castings are cored and should bear the entire expense of the core-making departments, and in which the production mixture (cored work to flatwork for example) varies from month to month.

### III. DOLLAR UNIT

#### A. *The standard sales dollar*

Bearing in mind that in budgetary control there must be found a measure of output which is rationally related to the variable expenses particularly, it will be apparent that the budgeted selling price may be used for measuring the rate of production of a specific commodity. The *unit* of measurement is then the standard sales dollar.

a. *Control of the business as a whole.* For example, if a product is budgeted to sell for \$5.00, the expense in relation to output may be represented as shown in Figure 53. The output in the month of May, for example, was 4,300 physical units or 21,500 budget dollars' worth of goods. The revenue was \$22,500 or \$1,000 more than budgeted, indicating a rise in the selling price. The cost of manufacture for May was as budgeted. In November there were 26,000 budgeted dollars' worth of goods sold at the budgeted selling price, hence, the revenue was \$26,000. There were 5,200 units of product sold but the cost of manufacture was less. In May the increase in gross profit over that budgeted was due to higher selling prices. In November there was also an increase over the budgeted gross profit but that was due to savings in the cost of manufacture. The several different products which a company may manufacture when expressed in budgeted sales dollars may be added in terms of this common unit but there is no common physical unit into which the total production of several products may be translated.

If a company produces several products, each having a different ratio of variable expense to the sales dollar, but with a uniform production mixture throughout the year, then also it is easy to see that the sales dollar may be used as a unit of output for budgetary-control purposes. If, however, the production mixture varies throughout the year, which it usually does, then the sales dollar is not directly usable as a measure of output and for the control of expense.

For example, if a company manufactures three products, A, B, and C,

each having variable expense respectively of 30, 40, and 50 percent of the sales dollars, it is apparent that if \$5,000 of Product A are produced in one month, the variable expense should be \$1,500. If with the next month \$5,000 of Product C only are produced the variable expense should be \$2,500. If in any month, \$1,000 worth of Product A, \$3,000 worth of Product B, and \$1,000 worth of Product C are produced, the variable expenses should be \$2,000. If the three products should have the same ratio of variable expenses to the sales dollar, then the budgetary control of the *total* variable expenses as the production mixture varies may be accomplished by the use of the

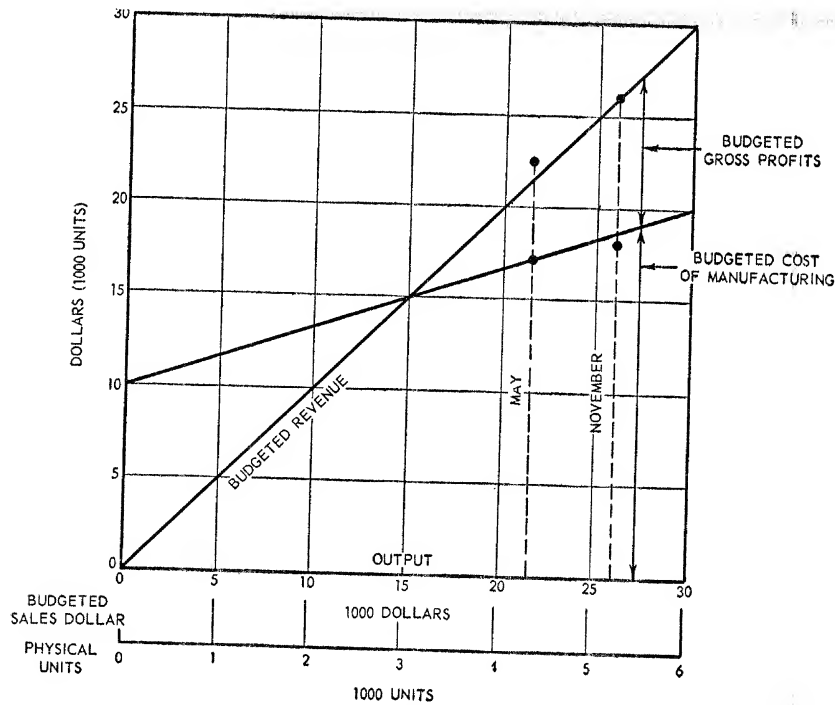


Figure 53. Revenue-Expense Control Chart

standard sales dollar as a measure of output. Here again, if the three products vary among themselves as to the *components* of the variable expenses such as labor and materials, then when the production mixture varies it is not possible, without recomputation of the expense items, to measure the detailed items such as labor and materials by the use of the standard sales dollar.

b. *Control of each department.* One of the problems which manufacturers face is the measurement of the output of departments which manu-

facture parts of the final product or which perform only specific operations on such parts. The output of such departments may also be measured in terms of the budgeted sales dollar as the following example will illustrate.

The first step in establishing such a unit of measurement for departmental output is to determine the standard cost of manufacture for the parts of the product as well as for the product as a whole. Such standard costs must be determined *for a specified rate of production* such as the average anticipated annual rate.

Thus a product consisting of five parts may be budgeted as in Table XXIV.

TABLE XXIV  
PARTS COST

<i>Selling price</i>	<i>\$5.00</i>	<i>Percent cost</i>	<i>Output value</i>
Cost of manufacturing of Part A	\$0.60	20	\$1.00
" " " " B	0.48	16	.80
" " " " C	0.72	24	1.20
" " " " D	0.60	20	1.00
" " " " E	0.39	13	.65
" " assembly and packing	0.21	7	.35
Total Manufacturing Cost	\$3.00	100	\$5.00

Thus Part A, which absorbs 20 percent of the cost of manufacture, may also be considered as contributing 20 percent of the budgeting sales revenue and therefore is budgeted to "sell" for \$1.00.

The monthly or weekly output of the department may then be expressed in budgeted sales dollars. If the department producing Part E, for example, turns in 2,000 units during a given week, it is credited with a "revenue from sales" of \$700 and against this revenue may be measured the labor cost, material cost, and the factory-expense items. Each department may have its own break-even chart with scheduled expenses and gross profits at varying rates of production. The psychological effect of having each department stand on its own feet profit-wise is of some importance. If a department or division of manufacture produces a variety of parts, or units of different size, its production during any month or week may also be measured in terms of the sum of the budgeted sales dollars of revenue of each lot of parts produced. The break-even chart for the department, however, must be designed according to the production mixture, that is, the relative proportion, of each variety of part to the total quantity produced. (See page 288.) For such departments as milling, drilling, forging, etc., the outputs may also be measured in terms of the budgeted sales dollar by the procedure illustrated in the following example:



Take the case of a product selling for \$5.00 and the cost of manufacture is \$3.00. Of the \$3.00, the cost of materials is 80¢. Then the cost of processing plus factory expense is \$2.20. The selling price of processing and factory expense may then be considered to be  $\$5.00 - \$0.80 = \$4.20$ , and the cost of the processing plus factory overhead is  $\$3.00 - \$0.80 = \$2.20$ . If a given operation, say milling, is standardized at a cost of 14¢, then that service may be considered to sell for  $\frac{14¢}{220¢} \cdot 420¢ = 26.72¢$ .

*B. The standard cost dollar*

When a number of products are manufactured by a company and each is sold, as is common today, at different prices (wholesale, retail, export, etc.), it will then be more useful for budgetary-control purposes to measure the output in terms of the standard cost dollar instead of the standard sales dollar.

Thus Part A in the above example will be given a weight of 60¢ in terms of the standard cost dollar instead of \$1.00 in terms of the standard sales dollar. Actual weekly or monthly variable expenses in all categories when plotted against output measured in terms of the standard cost dollar may then be compared to their respective budgeted amounts.

*C. The direct-labor dollar*

a. *Centralized Organization.* In the metal trade, since the total direct-labor cost of production in any month is directly proportional to the quantity of output of any specific product in the month, the direct-labor dollar is often usable as a measure of output. This requires that the production mixture as to wage cost be uniform. If, however, the production mixture changes, particularly so as to shift the relation between products at which the lower skilled and lower paid employees are working and the higher skilled and higher paid employees are working, then the labor dollar no longer is applicable as a measure of production.

In the use of this unit of measurement, each product manufactured is estimated to incur a direct-labor cost of a specified amount. This is its standard direct-labor cost. If products A, B, and C are assigned direct-labor costs of \$1, \$2, and \$3 respectively, then for a monthly output of 1,000 A's, 5,000 B's, and 3,000 C's, a total output per month of 25,000 units is accomplished. But the products must be quite uniform in respect to their ratios of direct-labor cost to materials cost and factory burden for this unit of measurement to be useful in the budgeting and control of manufacturing expenses. A difficulty arises in the use of a standard, such as the estimated direct-labor dollar, for a company's entire operations, when a company produces the same product in different plants which operate under different conditions, particularly as to wage rates and skills of the workers. The standard in one

plant must necessarily differ from the standards of the other plants. Which then is *the* standard?

b. *Decentralized organization.* This is a very timely problem since today many large and medium-sized companies are following the practice of decentralization, particularly of assembly operations. The standard previously established at the main plant loses its significance for the local plants in which conditions of operations, the wage rates and skills of the workers are substantially different from what they are at the main plant where the standard was set. At the same time the adoption of a different standard for each plant is an obstacle to the use of direct labor as a yardstick with which to measure production and for budgeting and control purposes. Faced with this dilemma in a number of companies, the writers have found it practical to use the "earned-labor dollar" as a standard, adaptable to all the plants of a company.

The term "earned-labor dollar" may perhaps best be described through reference to its use in a particular case in which the writers were engaged. The organization originally operated one central plant for the fabrication and assembly of its products, which were sold to other manufacturers with widely scattered locations. The company decided to decentralize its operations by fabricating all the parts at the central plant, continuing some assembly there, and assembling the bulk of its output in nine assembly plants more centrally located to its delivery points.

Before decentralization, production was controlled on the basis of the standard direct-labor dollar. The company at first attempted to use the standard established at the central plant in the nine decentralized assembly plants which were set up in small country districts and employed low-cost unskilled labor with no previous industrial experience. Wage rates, labor skills, and efficiency varied widely among the plants. The use of the common standard for all the plants resulted in inflating the variance accounts and control became meaningless. Local management lost interest in a goal which could not be attained.

As a second step, the company established a separate standard for each plant. The result then was that since one dollar of direct labor represented one thing at one plant and another thing at another plant, there was serious confusion in cost control. At this point the introduction of budgetary control, which had not been practiced before, was taken under consideration. It seemed necessary to reestablish a common unit of measuring production in terms of direct labor without losing the practical and psychological benefits that had resulted from the adoption of plant standards. The earned-labor dollar satisfied this requirement for control and budgeting purposes and was therefore adopted.

The earned-labor dollar is the dollar of wage that would have been earned at the local plant if the standard of performance and standard wages had been the same as at the central plant taken as a reference. For example: To perform a given assembly at the central plant, the standard time is 45 min-

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utes and the average wage is \$1.20 per hour, from which this assembly is equated to 90 cents of the standard labor dollar. In sub assembly Plant A the less skilled labor performs the same assembly in one hour and receives in wages 80¢ per hour, from which the local standard labor dollar in terms of which the output of this assembly is measured is 80¢. The quantity of output of both together could not be measured by adding the direct-labor expense account of the two plants. If, however, the direct-labor expense account of Plant A were divided by 80 and multiplied by 90, then, upon adding this result to the direct-labor expense accounts of the central plant, we have a direct measure of output, since this sum divided by 90 gives the total production of the two plants. If both plants were working on the given assembly only and the sum of their direct-labor expense account were \$9,000 then their combined outputs would be 10,000 units. Accordingly, the earned-labor dollar at plant A for the given assembly produced is  $\frac{90}{80} = 1.125$ . In

like manner the earned-labor dollar for each plant is similarly determined. Thus there is provided a unit of measure of productivity for each plant which may be used to measure the productivity of all and to budget the expenses of each.

#### D. *Time units*

The general theory underlying the use of this type of unit of measurement of output is, that a given plant is designed to produce a specified quantity of output in a given time. Stated in other terms, the cost of a product under specified conditions of manufacture is estimated on the basis of the time required to produce it. The time unit is the direct-labor hour. Furthermore, the quantity of material consumed in a given month is directly proportional to the number of standard hours spent on production during the month. Other variable costs also will total with the productive hours. The use of the labor hour as a standard of measurement output avoids the variance due to changes in wage rates. It also relates itself frequently to the standard system for estimating the labor-hour burden for factory expense apportionment to products made, and thus is adaptable to comparing actual burden with the standard burden.

#### CONCLUSION

All too frequently, ratios and numbers are used in measuring output which are not actually variable directly with output. Accordingly, before using such ratios or numbers, which may be acceptable in some other plant, it is necessary to check them as indicated above.

In the final analysis, budgetary control is considered effective when it results in maintaining the cost per dollar of sales at a minimum and the gross profit of the production mixture at its optimum point. To accomplish these results its units, methods, and means of measurement of the flow of expense

with the rate of production must be scientifically sound in their relationship to the specific conditions of operation. It should constantly be borne in mind that the budgeter sees the business from the point of view of the dollar of profit. For him the business is not primarily producing goods. First of all it produces dollars of sales at a cost per dollar resulting in a profit per dollar.

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